

TOURISM IN TORTOLA, BRITISH VIRGIN ISLANDS:
PERCEPTIONS TOWARD LAND CARRYING CAPACITY

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By

Christopher David Broom Howell

To the people of Tortola.

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A linear combination model (OASYS) was used to assess the potential carrying capacity of the island of Tortola for future tourist accommodation, according to physical, infrastructural and social parameters. Perceptions toward tourism development by Tortolians, continental residents, West Indian expatriates and visitors were gauged by means of a public survey conducted during the period July, 1974, to June, 1975. Local experts' evaluations of the suitability and importance of selected physical and infrastructural parameters were derived by separate questionnaire surveys. The sample for West Indian expatriates proved too small to be valid, and instead a survey of high school students was conducted.

Results of the OASYS program suggest that perceptions toward future tourism growth differ significantly according to culture group as well as age group. Tortolian respondents -- in particular, the high school students -- generally favored larger-scale development than either the continental expatriate or visitor respondents, with the latter group preferring little or no further development. Future tourist growth

scenarios, based upon the survey results and delineation of suitable development sites by the OASYS model, are presented for each culture group, and their ramifications for government policy discussed.

Lastly, the research results are compared and contrasted with other studies -- undertaken both prior and subsequent to the survey period -- that address tourism potential in Tortola. While earlier studies utilizing primarily economic criteria have tended to recommend a higher tourist growth rate, the results of more recent physical planning studies coincide closely with those derived from the OASYS program.

CHAPTER I INTRODUCTION

Problem Background

Travel for the purpose of pleasure is probably as ancient a custom as the establishment of civilizations. Queen Sheba, when visiting Solomon's kingdom (1 Kings X), could be described with some justification as a precursor to the modern tourist. In the 4th century B.C., the Greek Xenophon proposed that public monies be spent to provide accommodation for visitors to Athens (Young, 1973, p. 9). During the 18th and 19th centuries, the English "gentleman" was wont to embark upon a European tour, while at the same time the more affluent American family sojourned in London and Paris to imbibe the culture and latest fashions.

Technological advances in the 20th century have provided the means for a higher standard of living and greater leisure time to be attained by an ever-broadening sector of the population. Whereas in previous centuries international tourism was the domain of the privileged elite, it has become increasingly accessible to more catholic participation. Not only has travel abroad become accepted as a pleasure of life by the lower and middle working classes of industrialized nations, but also by a growing number of citizens of less developed nations. As a consequence, the travel trade has harnessed increasingly greater resources and enveloped increasingly larger areas to satisfy the burgeoning demands of tourists.

The visitor industry, in fact, constitutes one of the most rapidly expanding industries in the world (Patterson, 1968). Between 1950 and 1970, international tourist arrivals in all countries increased from 25 million to 168 million, representing an annual average growth rate of 10 percent (IUTO, 1972).¹ Similarly, international tourist receipts increased from \$2.1 billion to \$17.4 billion over the same period (Tourism Sector Working Paper, 1972, p. 3). In 1975, the number of international tourists had increased to more than 200 million, and tourist receipts approximated \$30 billion (Legislators' Seaside Resort Study Mission, 1975, p. A6).

An even greater expansion is predicted for the future. By 1980, if trends over the past decade continue, the number of international tourists is estimated to be in the vicinity of 325 million, or approximately 13 times the number of travellers in 1950 (Green, 1972, p. 24). Young has suggested that the potential for further tourism growth is far larger:

Bearing in mind that 95 percent of the world's population has not crossed an international frontier and that in 1971 only one-half of one percent of the world's population did so, it is a bold man who suggests that the tourist market is about to level off. (1973, p. 172)

In both economic and social terms, the massive transfusion of funds and people represented by the tourist trade must be considered as one of the prime causations of change in many host countries over the past few decades. Some of the more discernible effects of this phenomenon are discussed below.

Economic Impacts

The majority of economists traditionally have extolled the values of tourism development in less developed countries where natural resources, other than that of high aesthetic quality, are scarce. The industry

purportedly creates foreign exchange, offers employment opportunities, strengthens the service sector and provides a powerful incentive to increase infrastructure for use by both tourist and local citizen. For such reasons, the International Bank for Reconstruction and Development and United Nations' development agencies have actively encouraged the introduction and expansion of the industry in several developing nations.

The results of certain economic studies would tend to support the endeavors of international agencies and of local governments in promoting tourism. It has been estimated that the construction and operation of each hotel room creates between five and eight new jobs, and that the construction of 1,000 hotel rooms results in an additional \$3 million entering the local economy (Compania Financiera Dominicana, 1972, p. 9). Checchi and Company (1963) stated that the multiplier effect (additional circulation) of the tourist dollar was an "extremely significant element" in accelerating economic activity. According to one Soviet study as described by Young:

. . . the average profit, if that be the right word, from one tourist is equal to the export of nine tons of coal, 15 tons of oil, or two tons of grain. Further, if Lake Baikal were exploited as a tourist center, it would earn twice as much hard currency as the total export of oil from the USSR -- without depleting its stock of raw materials. (1973, p. 133)

It is hardly surprising, therefore, that less well-endowed nations have regarded tourism as a panacea for their economic woes.

Unfortunately, stark reality has a disappointing habit of suppressing, or even negating, the promises of theory. The economic returns of tourism to the host country often have been depressingly low. Bryden suggested that:

. . . tourism at present involves only minimal net flows of foreign exchange from developed to developing countries outside Europe, and at worst a net flow of foreign exchange to the developed countries. (1973, p. 64)

The primary reason for the apparent anomaly is that almost all of the tourism industry structure is controlled by large corporations of the more developed nations -- in particular, the United States, Japan and Western European countries. The need for visitor accommodation and immediate confirmations has forced the independent hotel into the large hotel chain, which in turn has been absorbed by the airline or large travel agency. This process of horizontal integration within the industry has resulted in most of the profit (if any) from the transportation of tourists and the operation of many of the larger hotels accruing not to the host country, but to foreign investors and shareholders.

The role of the tourism industry in stimulating other sectors of the economy is being increasingly questioned. Foreign-owned hotels generally buy little local agricultural produce, preferring instead to import the packaged and processed food stuffs to which their guests are accustomed. However, local government revenues derived from the import tax imposed upon these commodities may not increase, since it has been a common practice to extend liberal tax and duty "holidays" to new hotel operations.

Even more serious than providing less income than anticipated, tourism may be actually deleterious to other sectors of the economy, since it competes for scarce resources such as capital, land and labor. Agriculture, in particular, has declined rapidly in such tourism-dominated economies as the Cayman Islands, the British Virgin Islands and the Bahamas (Bryden, 1973, p. 47). Even where agriculture was, until

recently, extremely viable in providing a major export crop, the impact has been severe:

Tourism has . . . proved a doubtful blessing to the balance of payments of the Caribbean island of St. Lucia. This small island has depended for many years on its banana crop, from which it earned \$2.5 million in 1969 from 85,000 tons of bananas. The tourist boom, however, has caused a flight of labour from the land, leaving the task of growing bananas to the landowners and their immediate families. It has been estimated that the average family unit can only manage five acres without outside help. Since many of the units are much larger, there have been disastrous effects on productivity and considerable underutilization of land. . . . The switch to tourism has strained the balance of trade The problem is of course aggravated by the peak of the season coinciding with agricultural harvest and fruit picking time. (Young, 1973, p. 152)

It is not only in the Caribbean, however, where agriculture pursuits have declined. Switzerland, which possesses a tourism industry considered exemplary by many people within the visitor industry, has witnessed a large-scale sale and consequent abandonment of small farms as a result of high land prices:

At first [the small farmer] would feel he had done well. But the money would only have its full value if it were reinvested properly -- and he would have no skill or knowledge of this kind. What is likely to happen in consequence? When the tourist facilities are built, he is left landless, and trained only in the agricultural skills which are no longer relevant. Accordingly, the only work he can get is low-status work. (Leisure-Tourism: Threat and Promise, 1970, p. 30)

The point made in the above quotation is important so far as the participation of local workers is concerned. Often with very limited skills, the indigene usually undertakes the more menial and seasonal jobs, whereas middle and upper management positions are reserved -- especially in less developed countries -- for the skilled expatriate.

Apart from the adverse effect of declining exports upon a host country's balance of payments, the inflows of visitors may not only cause a large increase of imports in order to support the hotel trade, but also to satisfy the rising demands of the local citizenry. Runciman (1972,

p. 10) referred to the concept of "relative deprivation," whereby the indigene compares his own standard of living with the pattern of consumption by the tourist. This "demonstration effect" may cause the substitution of locally grown produce, such as vegetables, pulses and root crops, by imported processed commodities, as has occurred notably in Jamaica (Adams, 1968). Thus, a further strain -- and increased dependence -- is placed upon the host country's economy.

A tourist-dependent nation (for example, the Bahamas, the British Virgin Islands or Antigua) exhibits an extremely "open" economy, as expressed by Renucci:

Capital investments come from sources exterior to the development projects; they aim at satisfying demands from outside the island and create profits which, for the most part, leave the island. (quoted in Young, 1973, p. 141)

Such nations are thus highly susceptible to the fashion and economic fluctuations experienced in foreign countries. During the recent depression years of 1973 and 1974, for example, few hotels in the Caribbean realized a profit. The tourism industry is also vulnerable to the perceptions of potential visitors. After the murder in September, 1972, of six people in St. Croix, U.S. Virgin Islands (which was widely and sensationally reported by the American press), hotel occupancy levels decreased from an average of 70 percent to one of between 10 and 15 percent (Legislators' Seaside Resort Study Mission, 1975, p. A4).

Since tourism expenditures may be classified as "non-essential," they are subject to the whims of any other luxury item. A resort may be "in" one year, but "passe" the next. The ephemeral "jet set," for example, has long abandoned the traditional havens of Europe, the Caribbean and Hawaii, but is now diffused throughout Africa, South America, China, Nepal, the Philippines and even Antarctica (Green, 1972, p. 34).

The rich are replaced by the horde once a resort area has been "discovered," but the unique and unsullied aspects of the area may quickly disappear. Once fallen from grace, very few tourist centers regain it; as Young remarked:

Usually it is a one way process involving the deterioration of facilities, misuse of resources and the spoilation of the very assets that brought the tourists in the first place. (1973, p. 123)

The once ubiquitous endorsement bestowed upon tourism as a panacea for economic development should, therefore, be carefully reassessed. Tourism may not be the "golden goose," and economic returns may be but marginal. Of the tourist in Tasmania, it has been said:

. . . he arrives with a clean shirt and a \$A10 note and does not change either of them. (Young, 1973, p. 126)

In Spain, the average tourist in 1973 spent approximately \$80, a sum which did not particularly please the Government:

[This] is radically low and out of proportion with what Spain has to spend to adapt the country's infrastructure (especially roads, airports, power and water supply, sanitation) to the invasion and clean up the ecological damage caused during the years of unchecked expansion. Merely cleaning up the Costa Brava, 100 miles of Spain's 600 miles of Mediterranean coastline, will cost \$40 million according to official estimates. (Uebersax, 1973, p. 22)

Switzerland, even though extolled for its touristic virtues, has not been overwhelmingly blessed by the visitor industry:

In the Alps, the short-term local advantages accrued through tourism have been increases in land prices, seasonal winter employment and the development of small guest-houses. But in the long run, higher land prices destroy local agriculture, seasonal employment is created for non-local people and large hotels readily displace the family pension. In terms of industrial, economic activity, such transformations of the rural environment are common enough. Tourism, however, is no less an industry than steel manufacturing and its introduction into Alpine valleys has been no less destructive of total population patterns and traditional culture than if each hotel had been a blast furnace. (Cosgrove and Jackson, 1972, p. 127)

In Curacao, on the occasion the argument of economic necessity of tourism was proffered to Stanley Brown, member of Parliament of the Netherlands Antilles, he replied:

We are getting only a marginal effect from the hotels and shops. Only a few hundred people are employed by them directly, and the profits go into only a few pockets. The hotels buy none of their food locally, no pigs, not even a chicken. None of their furniture is made locally. Everything is imported. In return, we put in better roads for the hotels, give them our best beaches, put in electric lines -- public spending that we can use much better on welfare and housing. We're ending up the losers. (Greene, 1971, p. 12)

If the economic benefits of tourism are questionable, then the social ramifications are even more so.

Social Impacts

The subject area of social change and modification wrought by tourism has received little attention from geographers and economists alike, even though most of the criticism directed at the visitor industry has been in the field of social impact. A report of the World Council of Churches stated:

An excessive number of tourists can generate social strains in small and unsophisticated communities. The human effect, on this scale and on the international scale, of competition for tourist 'consumers' has been given too little attention and deserves serious research. (Leisure-Tourism: Threat and Promise, 1970, p. 21)

Perhaps it may be that the simplicity of utilizing the measurement of dollar flows as a surrogate for "development"² entices more researchers than the complexity of social interaction and change.

Peters (1969, p. 126) propounded that tourism creates social benefits arising from a "widening of people's interest generally in world affairs and to a new understanding of foreigners and foreign tastes." By far the majority of writers, however, have noted the disruption of

societies and the alienation of their citizens as being the major consequences of the inroads of mass tourism.

A primary reason for social discontent has been the unfulfilled economic promises made on the behalf of tourism. Inflation, the offering of only menial jobs and the vast discrepancies in income between tourist and local resident all present an impression to the latter -- be he in Spain or Jamaica -- that he has become a "second class" citizen in his own country. The inherent nature of tourism promotes a feeling of servitude; it must "live with an internal schizophrenic factor, derived from the confrontation of man at his leisure and man at his work" (Towle, 1971, p. 2). For a newly independent and proud nation -- especially if it has experienced a history of slavery, as in the Caribbean -- it is difficult to imagine a more potentially destructive industry than ill-managed and unplanned tourism.

It is unfortunate in many respects that the visitor industry is controlled by international concerns with no particular respect for the requirement of individual countries. The large, technologically advanced hotels require large quantities of precisely those resources which are often in short supply -- for instance, land and fresh water in the smaller Caribbean islands. In addition, the primary concern of overseas marketing agencies is to move masses of people, not to cater to local cultures and customs. In fact, in the less developed countries, cultural aspects are almost always ignored, with advertising instead emphasizing the 'normalized' attractions of "sun, sea and sand." An example is a recent article in the Eastern Airlines' magazine Review, which categorized and compared Caribbean islands under such labels as the "remotest," the "quietest," "prettiest," "most expensive," "least expensive" and the "sportiest" (Keown, 1977). No reference was made to

the islands' inhabitants; there were no categories for the "friendliest" or the "most culturally fascinating" island. The indigenes were totally ignored.

The international packaging of tourism is aptly portrayed in an article which appeared in the International Herald Tribune. Under a photograph of an attractive woman on a sunny beach, the caption read:

Where did you say? -- This poster of a sun-tanned girl (American), standing on the Beach (Tunisian), shot by a photographer (German) and bought from an agency (Italian) is designed to attract tourists to the seaside resort of Exmouth, on the Devonshire coast (English). (quoted in MacCannell, 1976, p. 142)

For the consumption of visitors, any unique customs and cultures are vulgarized for mass palatability, much in the same way as American hotel chains have standardized accommodation. Although there may be "no unexpected surprises," there certainly are no unexpected delights.

Perhaps it is because of the remarkable plasticity of the present-day Swiss culture that has made Switzerland so eminently successful in tourism. As MacCannell remarked:

her mountains and lakes are not merely nature, but "scenery"; she has an elaborate transportation system for the exclusive use of sightseers; her national dish, fondue, is exclusively a party dish; her peasantry has obligingly continued to use picturesque outfits and equipment, Heidi and William Tell costumes, Alpine horns and oversized cowbells, long after other European peasants have abandoned their colorful ways; one of her main industries turns out what are two of the most stable souvenirs not merely of Switzerland but of Western Europe, music boxes and cuckoo clocks; her chalets are the model of mountain recreation homes throughout the Western world. Interestingly . . . Switzerland is rarely criticized for being "too touristy". Some of the most outspoken anti-tourists I know point to Switzerland as the model of what a modern nation should be. (1976, p. 168)

In other countries, the populace may not be quite so obliging in performing for the visitor. In Hawaii, "local folks get a bit tired of performing the dance of the vestal virgins every morning at ten"

(Legislators' Seaside Resort Study Mission, 1975, p. ii). In a report by the World Council of Churches, it was suggested that:

People in South East Asia who were at the receiving end of the tourist-boom often felt that they were made into something like a human zoo. Tourists came along to see 'the natives' and to study the odd habits of natives. Local people were thus encouraged to be 'interesting natives', and go through traditional movements for the benefit of goggling strangers. It robbed a people of their dignity to be treated as zoo-objects.
(Leisure-Tourism: Threat and Promise, 1970, p. 31)

The loss of dignity, which has been mentioned by several authors (including Bryden, 1973; Demas, 1970; Naipaul, 1962), has been a common cause for active resentment towards the visitors.

Misleading advertising of a destination may cause dissatisfaction and resentment amongst tourists which, if reflected in their behavior, "may be heartily reciprocated" (Bryden, 1973, p. 95). Unfortunately, the ubiquitous classification of oceanic islands as "paradise" may all too easily produce such resentment. Many tourists are surprised when they visit Bali Ha'i, for example:

[The island] still drifts in and out of the mists, but it has underground cables now. Paradise has parliaments, passports, pollution and popcorn. (Rosenblum, 1973, p. 5B)

The former premier of St. Vincent, James F. Mitchell has attempted to dispel the theory of the "idyllic niche":

Let us face it, there is no paradise, only different ways of life. Not that paradise has been lost, or destroyed, but that it never existed. The North American trying to escape a big city problem like air pollution may not recognize the West Indian's problem of lack of opportunity in a small island. But it is a problem just the same.
(Nordheimer, 1973, p. E1)

Myths have a habit of lingering, however, especially when they are constantly revived in glossy brochures. The tourist, usually ignorant of the host country's culture and only knowledgeable of that country's "sun, sea and sand," may be abrasive and rude when his more exotic imaginations are dispelled.

Resentment amongst the local populace has become so apparent in certain destination areas that governments have been forced to wage publicity campaigns emphasizing the economic value of tourism. "Be nice to tourists" and "tourists are nice people" campaigns have been undertaken in several resort areas, including Miami, Florida, the Bahamas, Barbados, Jamaica, the U.S. Virgin Islands and Spain. At the same time, however, local and national governments continue to spend millions of dollars in advertising to attract even more tourists. Not even the symptom, let alone the disease, has been properly treated, and visitor-resident relations continue to deteriorate.

The Potential for Alternative Tourism Development: The Caribbean

A combination of factors, including historic and ethnic legacies, vastly discrepant incomes, restricted land area and employment opportunities, but primarily rapid and unplanned growth of the visitor industry,³ has induced in the Caribbean a more visible portrayal of the economic and social ill-effects of tourism than probably in any other resort area in the world. Major political upheavals during the past ten years in such islands as Jamaica, Curacao, Trinidad and Tobago and Grenada have only aggravated the uncertain climate for investment and the increasing hesitancy of tourists to visit certain resort areas.

The recession years of the 1970's were not particularly propitious for the hotel sector in several islands. An operating deficit was incurred in the industry as a whole in Barbados in 1971. In Puerto Rico and the Bahamas, the Government by 1974 had taken over hotels which were in the process of financial collapse. The Director of Tourism in Jamaica predicted in that year that ten hotels would declare bankruptcy. In 1973, two leading hotels in Curacao lost over \$1.5 million, and in the

Leeward and Windwards Islands as a whole, "few . . . have managed to break even" (Crozier, 1974, p. 5).

It was in this aura of gathering gloom that a special seminar, entitled Toward a Lasting Tourism, was held in Puerto Rico in 1972. Arising from the initiative of Herbert L. Hiller, then a recently appointed Executive Director of the Caribbean Travel Association, the seminar attracted tourist industry and government representatives as well as academicians from several disciplines.

The findings of the seminar were basically that the marketing and hotel industries were drastically out of touch with the needs and requirements of Caribbean islands. An "indigenous" style of tourism was called for, that could complement the existing internationally-oriented hotel activities. It was suggested that the visitor industry should cater more to the requirements and resources of small islands; instead of the traditional "give 'em what they want" attitude, the motto should be "what we have is what you get." James F. Mitchell, then premier of St. Vincent, remarked:

If you want smoked salmon, go to British Columbia If you want fresh lobster and king fish come our way. (Arton, 1972, p. 12)

The cultural aspects of the islands needed to be stressed, rather than merely the usual "sun, sea and sand" approach utilized in advertizing.

The "personalization" of tourism in the Caribbean has met with some limited success. In Jamaica, a "meet the people" program was inaugurated to enable visitors to be guests of private residents. In addition, that country now operates "Inns of Jamaica," a chain of small guest-houses that offers far more local atmosphere and amenities than the larger foreign-owned hotels. Similarly, Puerto Rico has its "Paradores Puertorriquenos," accommodation facilities that are considered representative of

the country's history and traditions. The Caribbean Hotel Association established a Small Hotels Advisory Council (SHAC) to give advice to small accommodation facilities. The Caribbean Tourist Research Center was initiated in early 1974 to advise governments in the planning and development of tourism.

The Puerto Rican and subsequent seminars have accomplished much, if only to increase awareness of the far more constructive potential that the tourism industry could conceivably offer small Caribbean islands in attaining national growth and development. The more things change, however, the more they stay the same. After the recession years of reorientation and reappraisal, the improving economic outlook has brought with it even more grandiose schemes of externally-oriented development. A tourism project is underway at present in the Turks and Caicos Islands that will utilize more than 1,500 acres on North Caicos for a massive resort (Bolt, 1977). In the Bahamas, the 'Club Mediterranee' is in the process of investing \$40 million to create four holiday villages, each capable of accommodating 600 guests ('News', 1976, p. 8).

It is extremely doubtful whether the above schemes will contribute significantly more to the long-term well-being of the islanders than previous externally oriented resort developments. Given their size, however, the proposed projects do present the risk of economic and social disruption on an unprecedented scale. Some questions raised by Hiller deserve serious consideration:

Mass tourism is not going to support Caribbean development. It may fill hotel rooms but that is not the same as development Here we are into about a quarter century's experience with tourism in the Caribbean. And can anyone tell me that service has improved? Can anyone tell me that labor relations in tourism have gotten better? Except for funds we receive in grants, has tourism made it easier for West Indians to buy a piece of land, or hold on to what they've inherited? Has our tourism encouraged West Indians to become

entrepreneurs? Has it taught us in the island to develop our own agriculture so we can feed visitors without importing food, or at least to buy from within the region rather than overseas? (1972b, p. 3)

Unfortunately, the answer to all of these questions must be in the negative.

Planning and Carrying Capacity Concepts

The rapid tourism growth of the 1960's occurred in several destination areas which were unprepared to cope with the influx of visitors. Piece-meal planning, rather than an overall development strategy, was the rule. A large airport would be built, irrespective of whether the infrastructure and hotel facilities could handle the incoming mass. As a result, several areas became overburdened with chaotic construction, crowded streets and pollution, all presenting serious problems. Both the economic and social effects were harmful to the local populations. The Legislators' Seaside Study Mission commented:

It would seem difficult for a government simultaneously to make tourism unprofitable for the private sector, costly to the taxpayer and socially unacceptable. But it has been achieved in some places. (1975, p. v)

Overall planning, no matter how well regimented, is an exceedingly difficult task once the damage has been done.

The concept of carrying capacity, or "saturation point," with regard to tourism has been increasingly discussed in recent years. Young (1973, pp. 111-112) mentioned four ways in which saturation of a locality or region could take place. First, land could be diverted to tourist uses, denying utilization for other purposes. Secondly, the tourism industry could absorb the local labor supply and adversely affect the productivity potential of the economy. Thirdly, the infrastructure could become overburdened. Lastly, a psychological saturation level could be reached among local residents.

Examples of all the above instances may be found readily. Some of the smaller Caribbean islands such as Nassau in the Bahamas are used primarily for recreation purposes. The Cayman Islands and the British Virgin Islands afford good examples of the large majority of the labor supply being harnessed to tourism activities. St. Thomas of the U.S. Virgin Islands is experiencing a severe overburden of its infrastructure, including the road system, water supply, electricity and sewerage. Even the Borough of Westminster in London may be cited in this respect.⁴ Areas of Jamaica -- for example, Kingston -- may be cited where a psychological saturation point has been reached or surpassed with regard to the local population.

A few countries have accepted the need for rigid control -- or even the prevention -- of additional tourism development. In Switzerland, some city centers have been closed to automobiles, the construction of large hotels has been banned, night flights in Swiss air space have been prohibited and a moratorium has been placed on the construction of additional airports (Green, 1972, p. 24). In Bermuda, the Government has suspended the building of additional hotel facilities until at least 1981 (Legislators' Seaside Resort Mission, 1975, p. 23). The Pacific island of Tonga simply has decided that it can do without the blessings of tourism.

Other nations are attempting to manage the growth of tourism according to designed goals. In the Seychelles, for example, it was accepted that:

The number of hotel beds to be permitted on any one of the inner islands (excluding the main island) should not exceed five percent of the population living on the island. The more remote islands where services and population were very limited were virtually "off limits" for any form of development except for a few small fishing lodges. (Lascelles, 1976, p. 20)

In St. Maarten, the Director of Tourism suggested that a maximum of 3,000 visitor beds be permitted (Young, 1973, p. 166).

Although undoubtedly sensible, such precautionary planning necessarily is somewhat arbitrary. While it may be relatively easy to distinguish the symptoms of overdevelopment once they are present, it is a far more difficult task to predetermine the type and bounds of growth that would prevent such ill-effects. The purpose of this present study will be to examine the feasibility of one method of analysis that potentially could provide assistance in this planning process.

Statement of Research Problem

The objective is the evaluation of the present and future impact of tourism development in the British Virgin Island of Tortola, mainly through the use of physical, social and infrastructural parameters. Based upon these parameters, the most suitable areas, as well as zones of possible contention, for tourism development will be delineated. The carrying capacity of different modes of tourism development within these areas will be examined and evaluated.

Research Hypotheses

Several authors (including Carter, 1964; Hall, 1959; Saarinen, 1969; Zelinsky, 1967) have noted that different culture groups perceive an environment, and utilize that environment, in different ways. In Tortola, three generally distinct culture groups exist -- the white continental residents, the West Indian expatriates, and the Tortolians

themselves -- as well as the transient visitor group. It is first postulated that perception by these groups of the environment, its development for tourism, and potential hazards (Kates, 1962; Burton and Kates, 1964) in any such development process, will differ markedly one from the other.

Secondly, it is contended that a study of primarily physical and social parameters of tourism development may suggest a different magnitude and type from that suggested by most economically-oriented studies so far undertaken.

Rationale and Need for Research

Since most investment has emanated from economically advanced countries, tourism development in the Caribbean has tended to be massive in scale, and an extension of the high technological -- and high energy-consuming -- design found in those countries. Because of their size, however, many of the Caribbean islands possess small, relatively fragile ecosystems, upon which the rapid growth of tourism is engendering such severe stress that one writer has referred to them as "an endangered species" (Towle, 1971). In a report issued in 1971, Grigg, VanEepoel and Brody stated that:

The tendency to convert natural systems toward the economic end to which they can most easily be converted cannot always be justified when weighed against the rapidly deteriorating quality of man's environment. (1971, p. 12)

Barely ten miles to the west of Tortola (the largest of the British Virgin Islands), St. Thomas presently is experiencing what may be termed 'second generation' problems. These problems have been exacerbated by what has been described as "a particularly bad case of irresponsible

development" (O'Shaughnessy, 1972, p. 32). As early as 1960, Kingsbury (1960, p. 21) considered that, because of its limited land area and local population, the island was rapidly reaching "tourist saturation." Orlins (1969) cites the problem of sewage disposal and resultant pollution in the harbor of Charlotte Amalie (sewage pipes were laid only in late 1972). Drinking water has to be shipped in by barge from Puerto Rico. Serious soil erosion has resulted from the construction of dwellings -- mostly for tourists -- on steep slopes.

The physical deterioration of an environment, especially as it affects the indigenous population, may be regarded as a "social cost," as defined by McHarg (1969, p. 34), rather than a simple economic cost; it is therefore the more difficult to recover in the final accounting process. Furthermore, tourism development in the Caribbean areas is being, and has been, undertaken with little or no regard to differing perceptions of the different culture groups present, with the result that stress amongst those groups may well have been intensified. "Stress" has been defined by Wolpert as "noxious or potentially noxious environmental forces acting upon an individual or a social group in such a way as to impose a perceived threat upon an accustomed way of doing things" (1966, p. 93). If, as all too often has happened, the decision-making process of tourism development and its accruing profits by-pass the majority of the indigenes, such stress and its accompanying feelings of resentment and hostility may readily surface. A manifesto published in St. Croix stated:

Brothers and Sisters this business of welcoming a tourist is bad. WELCOMING A TOURIST IS A WAY TO FORCE US BLACK PEOPLE OUT OF OUR HOME. We are trying like hell to make it buying our goods and services on a market set-up for people who are visiting and do not really care how much they spend. THE TRUTH IS:

Black people in the Virgin Islands are ENSLAVED to tourist trade.
(UCA Speaks, 1970)

Similar comments of resentment toward the tourism industry may be found throughout the Caribbean area. Persaud, in arguing against an increasing influx of tourists into the Caribbean area, succinctly suggested a solution to the problem:

. . . tourism development on these small vulnerable islands must be of the type that will generate economic development as well as enable the Caribbean people to continue to feel that the Caribbean is their home -- a place where they can continue to work and live and bring up their children
 (1973, p. 486)

Although tourism development has rapidly increased in the British Virgin Islands during the last decade, many of the problems already identified in the neighboring U.S. Virgins are not apparent. Certain early symptoms have been evident in "an influx of 'fast buck' merchants bent on taking advantage of the situation," as reported by Batham (1969, p. 563), but timely action by the Government has so far prevented physical deterioration of the environment and alienation of the Virgin Islanders before it was too late. The almost total development of Anegada as an international offshore trading center was halted, and the agreement with the Development Corporation of Anegada rescinded, after local opposition to the project became known to the Government (Harrigan and Varlack, 1971). Later, a request to build an oil storage plant on the same island was denied when it became apparent that the concerned company demanded exclusivity rights and an unhindered choice of site location. The passing of the 1970 Aliens Land Holding Regulation Act has limited land speculation.

If further tourism development is envisaged in the British Virgin Islands, however, and minimal degradation to the present physical and social environment is desired, there must soon be an investigation in

situ in order to determine at what stage there is a risk that social costs are likely to outweigh the economic benefits gained -- a stage that may well have been reached in other islands of the Caribbean. Economic analysis alone will not be enough, since there is an implicit assumption that what cannot be quantified directly in dollar terms (such as social costs) must be transformed to surrogate dollar terms. This approach has been criticized as being "narrow minded and based on false assumptions" (Burton, 1968, p. 472). Worse still, as McHarg points out, such social costs merely may be ignored:

Neither love nor compassion, health nor beauty, dignity nor freedom, grace nor delight are important unless they can be priced. If they are non-price benefits or costs they are relegated to inconsequence. The economic model proceeds inexorably towards its self-fulfillment of more and more despoilation, uglification and inhibition to life, all in the name of progress -- yet, paradoxically, the components which the model excludes are the most important human ambitions and accomplishments and the requirements for survival. (1969, p. 25)

Rather, an environmental management approach is called for. O'Riordan describes such an approach as recognizing:

. . . the interaction between man as a sociocultural as well as an ecological organism and the various external influences acting upon his way of life, analyzes the processes by which he interprets and responds to these, and attempts to direct his use of his biosocial environment in a manner best designed to meet both his long term and short term needs and aspirations. (1971, p. 177)

The proposed research project as it is here outlined will not be an attempt to study all the facets of environmental management, a task which would involve many hands and years. It does, however, attempt to answer partially the question posed by a British Caribbean premier during a seminar held in Miami in November, 1973: "how do you determine a future level of tourism that is not destructive to an island?" (Alternate Tourism Perspectives, 1973).

When denying the request for an oil storage plant on Anegada, the Honourable Willard Wheatley, Chief Minister of the British Virgin Islands, was quoted as saying: "[T]here is a long future ahead for the British Virgin Islands and had we now made the wrong decision, the greater part of the regret, suffering and anger would have belonged to that future" (Caribbean Monthly Bulletin, 1973, p. 22). It is intended that the proposed research, which will be an applied geographical study, will yield some information to help safeguard that future.

Methodological Approach

Within the United States since the mid-1960's, there has been an increasing endeavor to measure more precisely the total impact and social costs emanating from any major development project, dictated by burgeoning environmental legislation such as the National Environmental Protection Act (NEPA) of 1969. One such proponent of more comprehensive analysis was Ian McHarg, an architect and planner by profession, who evolved a simple, graphic, overlay technique -- or ordinal combination method -- initially to help to select the routes of proposed highways in the States of New Jersey and New York. The methodology used in this study is derived primarily from such an overlay approach.

The McHarg Overlay Technique

McHarg considered that nature constituted "a value system with intrinsic opportunities and constraints to human use" (1969, p. 34). A highway, for example, required certain conditions. If these already existed -- in the form of favorable slopes, reliable foundations and readily available construction materials -- then such propitious

circumstances would represent savings. Unfavorable conditions, on the other hand, would increase costs.

Unlike the highway commissioner or engineer, however, McHarg used the terms "savings" and "costs" to connote not merely economic factors, but also to encompass social and natural resource considerations. His premise was that physical, biological and social, as well as economic, parameters could be measured and represented as values in estimating total costs and benefits of a development.

The method utilized by McHarg was to identify the processes within an area that needed to be considered. Once these had been identified, they could be ranked:

. . . the most valuable land and the least, the most valuable water resources and the least, the most and least productive land, the richest wildlife habitats and those of no value, the areas of great and little scenic beauty, historic buildings and their absence and so on. (1969, p. 34)

Each ranked process, or parameter, could then be represented by appropriate grey tones, the darker the tone symbolizing the greater the cost (or unsuitability) with regard to physiographic parameters, or the higher the value with regard to social parameters. With the use of any transparent or translucent drafting material, the maps could be superimposed to reveal the composite, highest social cost areas by means of the darkest tone, and the least social cost areas the lightest tone. By choosing that area most compatible with the proposed development -- that is, the area represented by the lightest tone -- the "solution of maximum social utility" could be achieved, whereby "maximum social benefit could be derived at least social cost" (McHarg, 1969, p. 34).

McHarg readily conceded that all processes, or parameters, might not be of equal importance; suitable bedrock and slope, for example, could be

significantly more important in locating a highway than other parameter.

He thought it reasonable to presume, however, that:

. . . where there is an overwhelming concentration of physiographic obstruction and social value, such areas should be excluded from consideration; when these factors are absent, there is a presumption that such areas justify consideration. (1969, p. 34)

The CASAT Technique

The need for such literal "black and white" interpretation imposed by the nature of the McHarg technique limits its application in relation to "real world" problems. Ward, Grant and Chapman (1970), for example, attempted to apply the McHarg method to locating and planning a new town in San Luis Obispo County, California, but encountered difficulties. Apart from the major need for differentiation in importance between parameters, they found that the graphic technique allowed little flexibility in data representation without expensive conversion techniques or the drawing of new maps. Also, the technique was not able to cope simultaneously with two or more potential land uses -- such as housing, parks and highways -- requiring different conditions. Instead, a series of individual map overlays had to be compiled for each potential land-use -- an expensive and laborious task.

In order to overcome these limitations, Ward, Grant and Chapman devised a computer program which they named "Computer-Aided Space Allocation Technique" (CASAT). This linear combination method not only allowed a finer distinction to be made between parameters, but also offered some means of measuring the suitability of the mix of land-uses derived from different parameter-weighting alternatives. The computerized technique facilitated rapid and inexpensive changes in the data input, unlike the fixed graphic value representations of McHarg's method.

The CASAT technique is described below with the use of actual data collected for a small parcel of land, located in the author's study area of Tortola, British Virgin Islands. In this instance, the suitability of a subsystem, agriculture, is gauged by considering only three parameters -- soils, rainfall and slope.

Figure 1 portrays these parameters for a small cay (Frenchman's Cay), which is located adjacent to the southwestern tip of mainland Tortola. Just under one mile long (1.5 km), the cay reaches a height of 355 feet (325 m) and is characterized by relatively steep slopes. The geology and immature soils are varied, but are composed primarily of tuffaceous wackes and quartz diorite (Mather, 1971). The cay's low annual rainfall total of 40 to 44 inches (102 to 112 cm) is fairly typical of lowland Tortola.

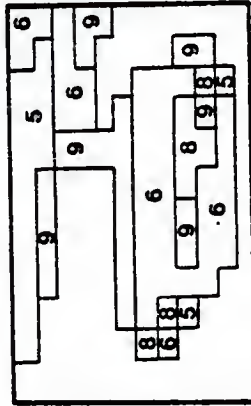
Once the chosen parameters have been mapped, their individual characteristics are divided into nine or less indexed classes, or data types;⁵ The parameter, slope, for example, has been designated four data types in Figure 1. These indexed classes are then substituted for the raw data in the original maps. The result is a numerical matrix portraying the spatial configuration of the parameter zones of classification (see Figure 1, Step 3).

Each data type is assigned a suitability value (Beta-value) according to how desirable it is considered to be in relation to the subsystem under review. Values are taken from a one-to-nine scale, on which nine signifies "most suitable," one signifies "least suitable," and five represents "neutral." In Figure 1, Step 4, for example, Index Type I (alluvium) is considered better suited for agricultural pursuits than any of the other three soil classes. Although prone to certain subjectivity, the assignment of suitability values should be guided by

SLOPE
Index Type Beta

1
2
3
4

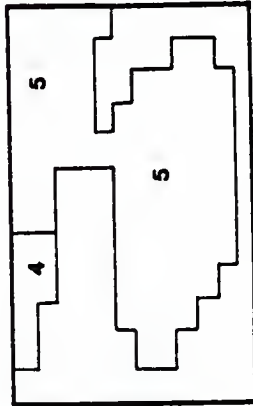
9
8
6
5



RAINFALL
Index Type Beta

1
2

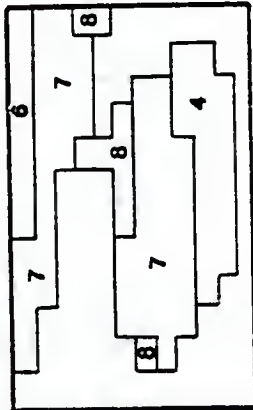
4
5



GEOLOGY/SOILS
Index Type Beta

1
2
3
4

8
7
6
4

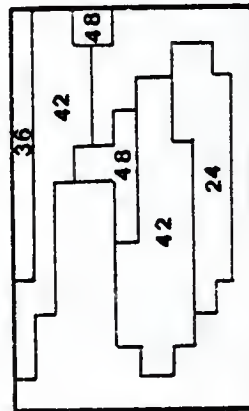
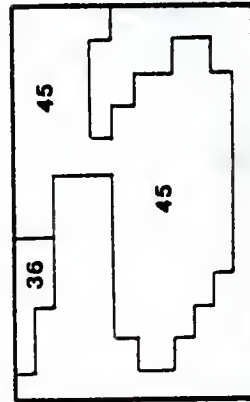
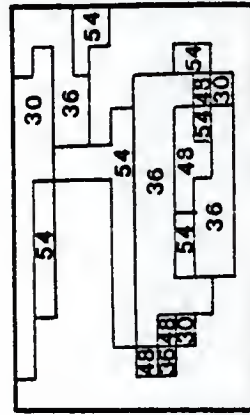


4. Beta Value Assignment

5. Beta Matrix

6. Alpha Value Assignment

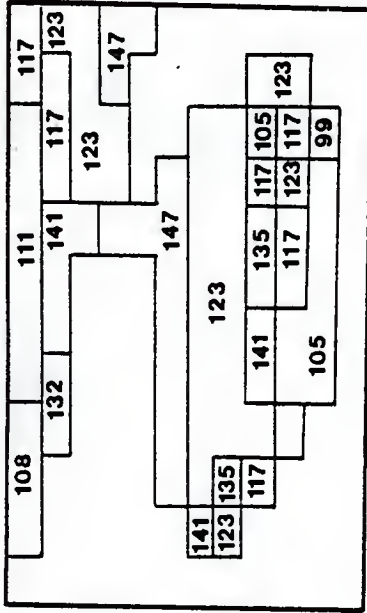
6



7. Alpha-Beta Matrix

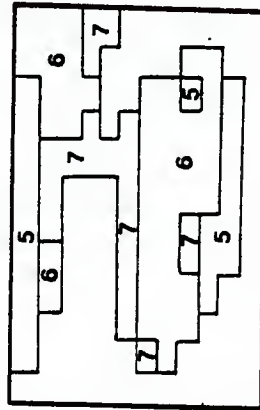
Figure 1: Derivation of Computer Matrices (Contd.)

8. Summation Alpha-Beta Matrix



9. Normalized Summation Alpha-Beta Matrix

Suitability for Agriculture



Actual Land Use, 1975

- | | |
|----------------|--------------|
| 1. Agriculture | 5. Mangrove |
| 2. Scrub | 6. Bare rock |
| 3. Woodland | U Urban |
| 4. Forest | |

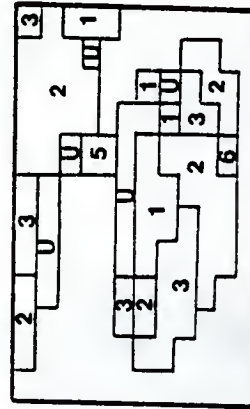


Figure 1: Derivation of Computer Matrices (Contd.)

scientific fact or empirical evidence. A "Beta-value matrix" is then constructed by substituting the suitability values for the data types, as shown in Figure 1, Step 5.

In order to assess the relative importance of each parameter in relation to the others, an "Alpha-value" is assigned on the same one-to-nine scale. In Figure 1, Step 6, rainfall is considered to be the most significant parameter, with soils and slope co-equal in lesser importance.

Each element in each suitability value matrix is then multiplied by the corresponding parameter weight, yielding an "Alpha-Beta matrix." All such matrices are summed by matrix addition to form one "summation Alpha-Beta Matrix." In order to convert this latter matrix back to a one-to-nine scale, it is divided by the sum of the Alpha values, or parameter weights.

With regard to Frenchman's Cay, the resulting normalized summation Alpha-Beta matrix suggests that the area is generally marginal for agriculture, although some coastline locations appear moderately suitable, demarcated by a rating of seven.

For the sake of comparison, the actual land use on Frenchman's Cay in early 1975 is shown below the normalized summation Alpha-Beta matrix. The land use configuration was derived from information contained in air photo coverage (Huntington, 1969), which was brought up to date through field research by the author. It may be noted that all land then cultivated corresponds to areas in the matrix with a rating of six or higher. Much of the highest rated coastline areas has been utilized for residences, which is not surprising considering the importance of kitchen gardens in the British Virgin Islands and elsewhere in the Caribbean. Elsewhere on the cay, higher rated land is associated with a richer

natural vegetation. The only major anomaly is in the causeway area, which is occupied by mangrove vegetation. Smaller anomalies may be accounted for by the influence of other parameters than those considered, such as land ownership patterns, as well as the fact that some areas classified as "scrub" represent fallow rather than a climax vegetation.

A problem arises when more than one subsystem needs to be evaluated for the same area. Certain types of tourism development in Frenchman's Cay, for example, might be more appropriate than agriculture. In this instance, Ward, Grant and Chapman suggested the use of a "Gamma-value," which would measure the relative importance between subsystems the same way as an Alpha-value distinguishes between parameters. It should be noted that the assignment of both Gamma and Alpha-values is subject to a greater degree of subjectivity than associated with Beta-values. An ardent horticulturalist, for example, might object to the proposition of potentially good agricultural land being utilized for another purpose.

The OASYS Program

Bowers' (1971) space allocation model entitled "Optional Allocation System" (OASYS) is essentially a Fortran modification of Ward, Grant and Chapman's PL/I computer program. It performs the same task of using parameters to evaluate a subsystem, as well as assessing the suitability of a system in terms of its potential subsystem.

The OASYS Program was later used by Wolter (1973), in cooperation with other members of the Department of Architecture, University of Florida, in an attempt to map the impact of Walt Disney World's development upon the surrounding Orlando area in Florida. The subsystems considered included agriculture, commercial, cultural and institutional, natural systems, parks and recreation, and residential activities. The intention of the study was to determine the highest quality of the

environment that theoretically could be obtained through controlled growth (Wolter, 1973, 1).

Although no publication resulted directly from Wolter's research, the Department of Architecture did eventually publish a voluminous report on the Green Swamp, a major natural water recharge area which was included within the original study region. The OASYS program was used to identify those areas in the Green Swamp that should be protected from alteration or development (Green Swamp Study Planner's Manual, 1975).

Modifications to the OASYS Program

Previous users of the OASYS program have concentrated on land use allocation problems within areas sufficiently homogeneous as to be encompassed within one system. A small oceanic volcanic island, however, may display such widely varying features that more than one system may be required, especially in relation to the derivation of Gamma-values. The subsystem, natural vegetation, for example, may be weighted favorably for allocation on inland slopes, but it may receive a completely different Gamma-value with regard to a coastal lowland area.

For the purpose of land allocation in Tortola, therefore, another tier was added to Ward, Grant and Chapman's hierarchy -- that of five systems so as to incorporate all of the features of the island, as shown in Figure 2. A listing of the systems, together with all the subsystems and parameters, is presented in Table 1. The data types or classes used for each parameter are discussed separately in Chapters II, IV and V, addressing each subsystem in depth.

As suggested by Wolter (1973, p. 14), the Alpha-values and Beta-values were obtained by means of surveys given to various expert evaluators (all of whom, for the purpose of this study, resided in Tortola). The three subject areas of agriculture, commerce and light industry, and

LEGEND

1. Coastal lowland : 0-12°, adjacent to coast.
2. Coastal rocky area: 13°+, extending inland to 250' contour line.
3. Inland slopes : 23°+, above 250' contour line.
4. Interior upland : 0-22°, above 500' contour line.
5. Urban area : Road Town and East End/Long Look, as defined by Anderson (1973).
6. Sea Cliff : not considered in OASYS Program.
7. Beach : not considered in OASYS Program.



Figure 2: OASYS Systems, Tortola

Table 1: Systems, Subsystems, and Parameters

<u>Systems</u>	<u>Subsystems</u>	<u>Parameters</u>
Coastal lowland	Natural Vegetation	Vegetation (existing)
Coastal rocky areas	Agriculture	Soils
Inland slopes	Commerce	Water supply
Interior upland	Resort housing	Slope
Urban Regions	Hotels	Proximity to urban areas
	Industry	Size of land properties
		Communications
		Proximity to the sea
		Aesthetics
		Power supply
		Perceived tourism development

lastly hotel, resort housing and developed recreational areas, were addressed in separate questionnaires (see Appendices IV, V and VI). The Gamma-values, on the other hand, were obtained by means of a survey questionnaire distributed to the general public (Appendix II). In order to test the hypothesis, that different culture groups perceive an environment and its utilization in different ways, the questionnaire was designed to enable separate Gamma-values to be designated for each group. All three values were assigned a rating scale of one-to-nine, as used in the CASAT technique. In Bowers' OASYS program, and as utilized by Wolter (1973), the rating scale was modified to one of one-to-ten; this scale was not used, however, since it lacked a mid-way, neutral rating.

The parameter data types were mapped on an 80 x 146 grid, covering the whole of Tortola at a scale of 1:35,000. Each grid cell represented an area of approximately 90 x 145 meters. Only those cells representing the actual land surface of Tortola were entered into the land use allocation process. Furthermore, already built-upon areas were excluded from consideration, since they could still be occupied by the same structures in twenty years' time; in contrast, culture group perceptions over that length of period could easily change with the coming of a new generation, thus negating any of the technique's findings. The system's "urban region," therefore, comprises all land not bearing structures but within a predominantly urbanized area.

As a postscript, it should be noted that since the OASYS method weights parameters individually, it assumes that the latter are independent of one another. Hopkins (1977, p. 392) has contended, however, that certain parameters are at least partially interdependent -- for example, vegetation, rainfall and soils. While the author agrees with this

statement, the application of the linear combination method in this particular study may be defended in that the author did not wish to impose his judgement of interrelationships upon the perceptions of the culture groups and expert evaluators. Although the initial selection of parameters was a value judgement on the part of the author's, their importance with regard to land utilization was solely and deliberately determined by survey responses.

Organization of Study

Selected physical characteristics of Tortola are discussed in Chapter II. Chapter III presents a summary of the economic and demographic history of the island, including the recent development of tourism. Chapter IV examines some of the ramifications of tourism growth on the physical and demographic base, as well as upon Tortola's infrastructure. The survey design that was utilized for the study and the research results are presented in Chapter IV. These results are compared with those of previous studies pertaining to the development of tourism in Tortola in Chapter VI. Finally, the study's conclusions are presented in Chapter VII.

Notes

1. A 'tourist' is generally defined as a visitor who stays for at least 24 hours (Matley, 1976, p. 2). This definition has been utilized in the past by IUTO (now named ITO -- International Tourist Organization).
2. Economic growth is not necessarily synonymous with development. One of the best definitions of 'development' that the author has encountered was proffered by participants during the seminar Alternate Tourism Perspectives:

. . . the creative manipulation of an environment by the peoples of that environment for their own benefit. It involves participation in all decision-making processes and some degree of equity in the distribution of the benefits. It is a humanizing process which requires the positive participation of the people in determining their destiny. It must include the increase in the power of the community and that of the individuals in the community. It may in the long run include economic growth, but not at the expense of social cohesion. (1973, not published)

3. Tourism arrivals in the Commonwealth Caribbean doubled between 1962 and 1968 -- from 830,700 to 1,716,000, respectively (Bryden, 1973, p. 100) -- and increased to approximately 2.4 million by 1975 ("Caribbean Tourist Statistics, 1975", 1977).
4. The report, Hotels and Tourism in Westminster (1972), remarked:

The major clusters of converted hotels are situated in primarily residential areas and are within designated conservation areas. The level of hotel activity in these areas has led to considerable loss of amenity to remaining long-term residents, through vehicular obstruction, high traffic flows, lack of parking space because of the competition from hotel guests and staff, and late-night activity and noise caused by hotels themselves and by associated uses such as restaurants and clubs. In many cases, the use has a greater adverse impact on the environment than the visual effect of the hotel buildings. (quoted in Young, 1973, p. 122)
5. Through numerical indexing, the CASAT technique is capable of offering more parameter zones of classification than the earlier graphic method, since the latter is restricted to the number of separate shades that can be easily discerned. McHarg (1969), for example, limited parameter classes to three in his highway routing studies.

CHAPTER II PHYSICAL PARAMETERS

Introduction

The purpose of this chapter is to present a broad overview of the physical parameters that were utilized in the OASYS model. These included soils, slope, water supply and vegetation. Although representing the more natural intrinsic elements of Tortola, a majority of the parameters have been modified to a greater or lesser extent by man's actions; almost all of the island's original natural vegetation, for example, has been removed, with consequent changes in certain of the soil characteristics. Also, the water supply provided by annual rainfall has been supplemented in urban areas by the tapping of underground reserves. Before each of these parameters can be discussed, however, and as a general introductory note, the location and size of the Territory and the study area of Tortola are outlined below.

Location and Size

In total, the British Virgins archipelago comprises over sixty islands, islets, rocks and cays which straddle latitude $18^{\circ} 25' N$ and longitude $64^{\circ} 30' W$. Located on the eastern extremity of the Greater Antilles submarine ridge and separated from the Lesser Antilles by the deeper water of the Anegada Passage, the Islands are approximately 60 miles (100 km) east of Puerto Rico, 1,700 miles (2,700 km) southeast of New York and about 3,800 miles (6,100 km) southwest of Great Britain.

The Territory is distributed naturally in four groupings situated around the shallow Sir Francis Drake's Channel, in the general form of a wishbone (see Figure 3). To the south are located a series of islands and cays, extending northeast from the larger United States Virgin Island of St. John for some twenty miles and terminating in the island of Virgin Gorda. To the north of the channel and parallel to the southern group lie the islands of Great Thatch, Tortola, Beef and Great Camanoe, with the smaller Dog Days stretching toward northern Virgin Gorda. To the northwest of Tortola and separated by another, smaller channel are located the Tobago Cays and Jost Van Dyke. Lastly, Anegada forms an isolated fourth unit lying approximately 14 miles (22 km) north of Virgin Gorda and 19 miles (31 km) northeast of Tortola.

Tortola is the largest island in the archipelago with an area of 21 square miles (54 km²), equivalent to 35 percent of the Territory's total land area of 59 square miles (153 km²). Somewhat resembling a prone seahorse in shape, the island is 10 miles (16 km) in length and with a maximum width of slightly over 3.5 miles (5.6 km). General characteristics of Tortola are portrayed in Figure 4.

Geology, Topography and Soils

Described as possessing the most rugged form of all the Virgin Islands (Meyerhoff, 1926, p. 84), Tortola rises to a maximum elevation of 1,710 feet (521 m) in Mount Sage, and much of its interior upland is in excess of 1,000 feet (300 m). It is generally impossible to cross from shore to shore without ascending nearly 1,200 feet (365 m), since no transverse valley or pass dissects the undulating central ridge of the island. The intermittent streams drain laterally off the flanks and slopes of the ridge and fall abruptly to the sea and narrow coastal flats.

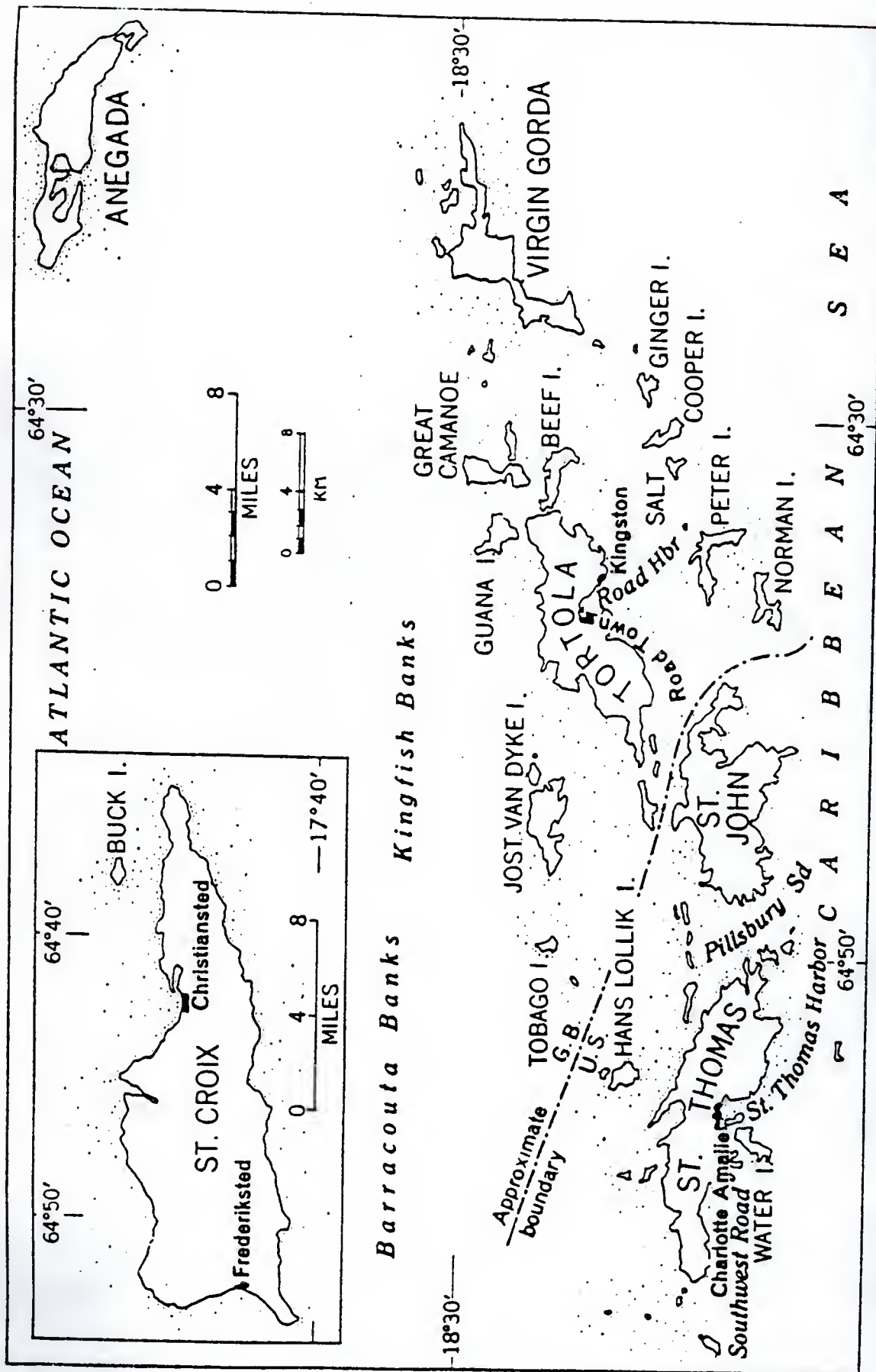


Figure 3: Base Map of the British and U.S. Virgin Islands (Kingsbury, 1960)



Figure 4: Base Map of Tortola

Tortola's harsh relief and irregular shoreline are the result of a turbulent and oft-changing geologic history. The oldland comprises complex mass folded stratified surface volcanics, thin limestone sediments and hypabyssal volcanic intrusions, cut by massive dioritic intrusives (Meyerhoff, 1926, p. 89). The rocks record a period of extensive volcanism, many of whose explosive products were redistributed and stratified in a shallow sea. During periods of volcanic quiescence, thin fossiliferous limestones were deposited. Although Donnelly (1960) asserts that part of the oldland is Lower Cretaceous in age, most authors concur that it probably falls within the Upper Cretaceous zone (Helsey, 1968; Kemp, 1926; Martin-Kaye, 1959; Mather, 1971; Quin, 1907).

The limestone accumulation was terminated at the close of the Eocene period by, respectively, folding, intrusion and faulting (Donnelly, 1966, p. 4). Meyerhoff (1926, p. 89) also suggests uplift, though this may well have occurred at the time of faulting. The resulting range of complex mountains was reduced through subsequent fluvial erosion to an imperfect peneplane, as indicated by the relatively level summits of the central ridge of Tortola. As may be noted in Figure 4, many of the maximum elevations in central portions of the island range from 1,000 feet (300 m) to 1,400 feet (430 m) only.

Whereas Davis (1926) places the Virgin Islands in general in the first cycle of erosion, Kemp (1926, p. 66) and Meyerhoff (1926, p. 68) place them in the second cycle. According to the latter author, the first cycle was interrupted by an uplift of between 700 and 750 feet (200 and 230 m.), and the second cycle reduced all but the central cores of the present larger islands to a surface in late mature or old age dissection. Again, an uplift of approximately 500 feet (150 m) rejuvenated the streams, which cut into the second erosion cycle and

resulted in the formation of larger valleys with a marked discordance in gradient at elevations ranging from 300 to 400 feet (90 to 140 m).

Secondary submergences brought the waterline within five to six fathoms of its present position, drowning the dissected coastal plain and leaving above sea level only a few ridges and cuestras, which were rapidly planed by wave action. The growth of barrier reefs occurred around portions of the platform's margin. Lastly, further submergence brought the water level to its approximate present-day position.

The features of drowning exhibited in much of Tortola's shoreline are primarily the direct outcome of the last upward movement of the strandline. This movement occurred long enough ago to produce the present-day alluvial filling of the heads of harbor digitations (Baynes, 1970, p. 2; Vaughan, 1916, p. 58) and the sea cliffs at the end of promontories. A classic example of this apparent anomaly of immature headland cliffs juxtaposed with obviously mature spurs and valleys is found in the Coxheath area of southwestern Tortola, where the valley is flanked on its seaward side by cliffs occasionally attaining 250 feet (76 m) in height.

The natural division of the islands into two parallel groups is the direct expression of the underlying structure. On the north and south exist broad strips of massive pyroclasts and shallow intrusives in which structural control of the surface forms is lacking; in the center occur thin-bedded sediments and tuffs, indifferently resistant to erosion. Meyerhoff describes the result of such a formation:

Physiographically, the weakness of the sediments is most significant. An easy prey to fluvial erosion, they have been readily excavated into aligned subsequent valleys, which by submergence have formed the line of channels separating the northern and southern island groups. (1926, p. 97)

Within the bordering channel area the surface forms, shorelines and arrangement of the islands are dominated by the geological structure. They comprise steeply dipping sediments (often in excess of 45°), and the cays and peninsulas are elongated from east to west in the direction of the strike, such as in the instance of Frenchman's Cay. According to Meyerhoff (1926, p. 99), there is the apparent existence of a strong northwest-southeast fracture system, resulting in many of the ravines which dissect the upland to run in a concordant alignment.

The existing geological formation of Tortola is shown in Figure 5. Massive eruptives and shallow intrusives, including unstratified or crudely stratified coarse agglomerates, are prominently developed in northern Tortola, as shown in various cliff and other sections between Cane Garden and Josias Bay (Baynes, 1970, p. 2; see Figure 6). These types are characteristically massive and have weathered alike, irrespective of their various structures and attitudes. They contain no quartz, and weather rapidly by chemical decomposition rather than by disintegration (Meyerhoff, 1926, p. 93). The topographic forms produced by erosion in all of the rocks in this division are alike; they bevel the structure indiscriminately. The young valleys cut into the upland are deep and V-shaped, while in the more mature valleys -- of which there are few -- the forms are normally well-rounded.

The deep-seated igneous intrusives are also massive in character and include a structureless aggregate of plutonic types, with a wide range in composition and texture. They occur as sporadic injections in southwestern Tortola, but the most extensive areas outcrop in the eastern segment of the island and on adjacent Beef Island. The erosional forms assumed by this type of rock are strikingly distinctive wherever it is found in bodies large enough to exert an influence on the topography. On

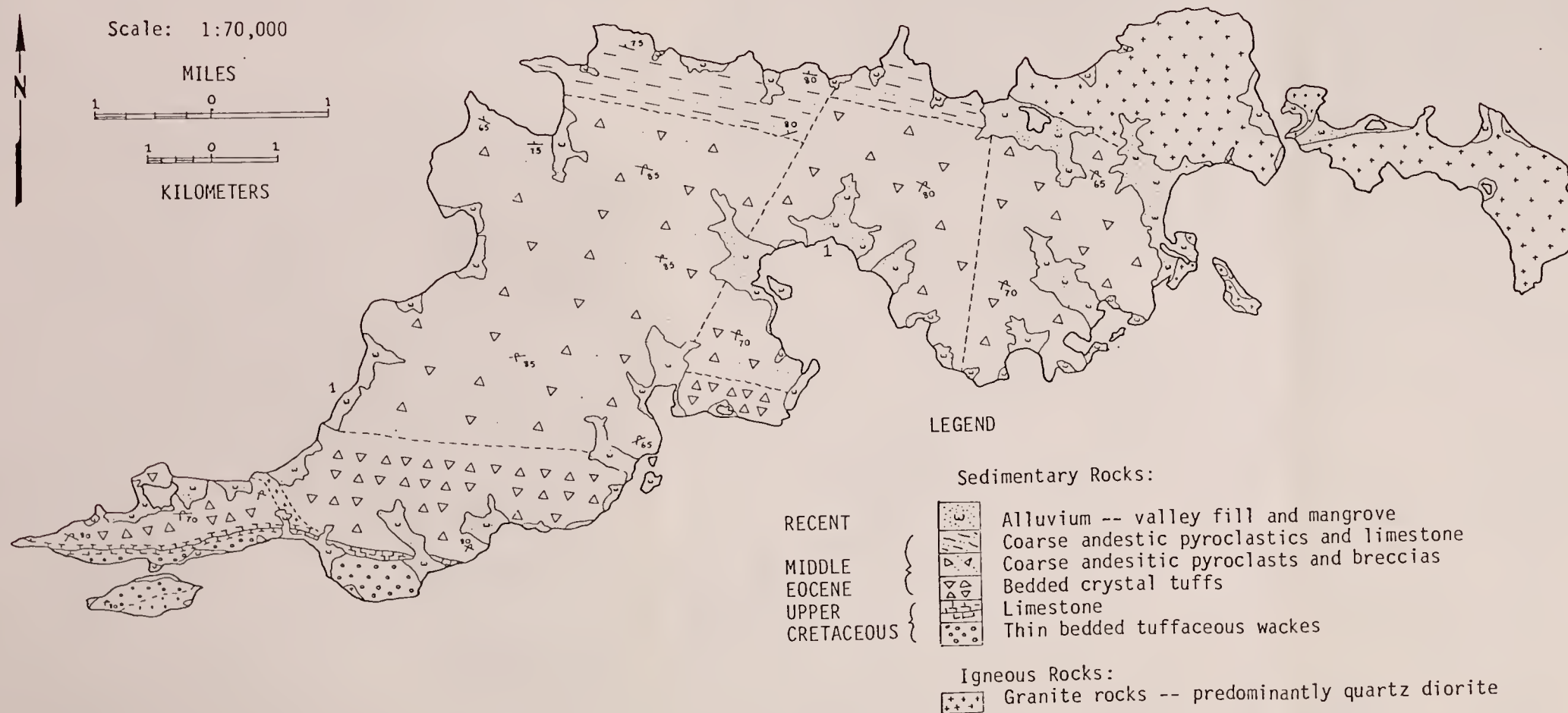


Figure 5: Geology of Tortola (modified after Mather, 1971)



Figure 6: Tortola's North Shore. Uniform erosion is indicated, together with signs of rejuvenation -- for example, the presence of mature spurs with abutting headland cliffs.



Figure 7: Crystalline Limestone Formation, South-West Tortola. This resistant rock has weathered to form a steeply inclined ridge, portraying piton characteristics.

Beef Island, for example, diorite has decomposed through spheroidal weathering along the joints, resulting in a tumbled mass of large boulders. In general, the igneous rocks offer weak resistance to weathering, and in some instances underlie more recent alluvial deposits in coastal lowland areas (Meyerhoff, 1926, p. 95).

The largest group of rocks in areal extent is that of the thinly stratified volcanics and sedimentary rocks. The former comprise coarse andesitic pyroclastics, whereas the sediments include thinly stratified tuffs and shales. Interspersed with these, however, are at least three limestone members of two different varieties: one, a dense lime mud; the other, a massive crystalline limestone. The topographic forms produced by these sediments conform with their structure. The crystalline limestone, usually dark grey though occasionally white, extends from Coxheath to West End in Tortola, forming a ridge above the surrounding levels. The other sediments generally constitute the weakest division of the rock groups (Meyerhoff, 1926, p. 95).

Lastly, surficial deposits are found in scattered locations around the shoreline of Tortola. They include valley fill and alluvium, and are of restricted extent laterally, occurring in the flats of the more important ghuts and valley bottoms such as in Huntums Ghut, Road Town. According to Baynes (1970, p. 2), these deposits occasionally attain a thickness of up to 100 feet (30 m) near the shoreline, but become increasingly shallow inland.

As depicted in Figure 8, the surface of most of inland Tortola has a slope in excess of 23° . More gentle slopes usually are confined to the coastal areas of alluvial deposits, although the central ridge of the island displays its rounded topography, with moderate slopes of 13° to 22° frequently encountered.

LEGEND

1. 0 - 12°
2. 13 - 22°
3. 23 - 30°
4. 31 - 45°
5. > 45°



Figure 8: Parameter Slope

Soils

According to the United Kingdom Foreign and Commonwealth Office report for 1974, the Islands' soils have never been studied in detail, but are described as shallow, friable and permeable brown loams, with frequent outcrops of bare rock. They are generally young, immature and, in the opinion of the above report, "probably the rockiest and stoniest in the world" (1975, p. 61).

The simplified classification of soil types utilized for the OASYS program (depicted in Figure 9) were derived from the soil survey undertaken by Baynes in 1970. He concluded that the dominant soil forming factors are parent material and relief (1970, p. 8). Generally, the soils contain a large quantity of sand particles, little silt and various amounts of kandoid clays. Soils tend to be shallow, usually stony, friable, well-drained, and range in reaction from slightly acid (pH 6.5) to strongly alkaline (pH 8.8). Most of the soils are base-saturated and many contain quantities of free calcium carbonate. On a whole, the soils are expected to be phosphate-deficient with a moderate to low potassium status (Baynes, 1970, p. 10).

Baynes broadly divided the soil types into two categories -- those of the steep hills and mountains, and those associated with coastal flats and valleys. The former cover over 80 percent of the island and -- as noted earlier in this chapter -- are derived from a variety of parent material.

The soils over the dioritic and other intrusions occurring mainly in the eastern end of the island have developed under low rainfall conditions, as indicated by the xerophytic nature of the vegetation typical of the area. A stony and shallow soil, with a depth of about 15 inches (38 cm), clings tenaciously to the area's steep slopes which occasionally

LEGEND

1. Alluvial
2. Volcanic
3. Limestone
4. Diorite



Figure 9: Parameter Soils

attain an angle of 45°. A site examined by Baynes (1970, p. 10) just to the north of the settlement of Long Look portrayed a dark reddish topsoil of sandy loam texture, overlying a red subsoil colluvium with seams of calcium carbonate. Results of a mechanical analysis of the topsoil indicated 38 percent coarse sand, 33 percent fine sand, 9 percent silt and 18 percent clay. The soil sample reflected a low phosphate status, and a saline sub-soil was suggested.

Soils overlying a range of volcanic or partially volcanic parent material form by far the greatest of the island's surface. Because of the geological complexity of the area, however, the soils vary considerably. In the extreme north of the island, for example, where pyroclastic agglomerative parent material occurs, mechanical analysis showed a preponderance of coarse sand (46 percent), 23 percent fine sand, 12 percent silt and 18 percent clay. In comparison, the corresponding percentages for soils on the southern slopes were 34, 27, 15, and 22 percent, respectively (Baynes, 1970, p. 11). Even in the southern portion of the island, the soils varied: those over massive rock displayed a Reddish Brown topsoil, having a sandy loam texture and overlying a Reddish Yellow subsoil, whereas soils over colluvial material -- such as around Road Town -- were of a yellowish red sandy clay overlying a red subsoil showing increased alkalinity with depth (Baynes, 1970, p. 14).

Soils of the coastal flats and valleys are extremely limited in extent and are of colluvial-alluvial types. They sharply reflect the surrounding hills from which they were developed; for example, the Coxheath soil is strongly alkaline in nature as a result of the parent material of the Towers Limestone formation.

Climate and Water Supply

The British Virgin Islands lie within the Trade Wind belt and possess a subtropical climate. Average temperatures in winter vary between 71°F and 82°F (22°C and 28°C), seldom dropping below 67°F (19°C). In the summer, the temperatures fluctuate between 78°F (26°C) and 88°F (31°C). Sea breezes temper the summer heat, and usually there is a drop in temperature of up to 10°F (6°C) at night.

Squalls are fairly common at certain times of the year, and mild storms are occasional. Hurricanes occur infrequently; the last one to cause extensive damage struck Tortola in 1924. There is, however, a theoretical risk of a serious hurricane occurring on average about once every 24 years (Baynes, 1970, p. 4).¹

Typically, Tortola experiences both a marked dry as well as a wet season. The dry season generally includes the months of February through April, although in some years it may also include the months of December and January. If, however, long troughs extending southward from cyclones of the middle latitudes are prevalent, then these latter two months tend to be wet (Stone, 1942, p. 60). By February, in most years, the dry season has obviously arrived. March characteristically is the driest month, with the subtropical North Atlantic high pressure system stretching far to the southwest. At this time, according to Stone:

. . . the moist unstable surface layers in which the trade-wide cumulus clouds form are [almost] constantly overlaid by a . . . warm dry, stable layer This trade inversion layer generally prevents any convection originating in the surface layers from reaching high enough to produce any showers. (1942, pp. 57, 61)

Towards the end of April there is a likelihood of heavy showers, but the spring rains usually begin in earnest in May. Increased heating of the land surface "forces the convection to penetrate the trade inversion

occasionally with resulting intense showers" (Stone, 1942, p. 65). By the month of June, the stability aloft is still marked, but instability in the lower layers is usually less pronounced than in the preceding month. Generally, the greatest water deficiency occurs in June and July (Stone, 1942, p. 74).

Rain during the latter part of the year is brought by easterly waves, which are troughs of low atmospheric pressure forming on the northern edge of the Intertropical Convergence Zone and moving slowly along it in a westerly direction. They bring with them rainy or overcast weather lasting from a few hours up to several days. This weather pattern usually persists until November, producing the rainy season for the Territory. If one of the easterly waves is particularly active, a hurricane may develop.

In a report which he edited, Bowden considered that of the northwest Virgin Islands, the rainfall of Tortola "is by far the most conjectural" (1970, p. 17). Rainfall, never copious, apparently has diminished over the last few decades: during the period 1901 to 1951, the average annual precipitation for Road Town was approximately 53 inches (135 cm), whereas over the longer period 1901 to 1974 the corresponding figure dropped to 48 inches (122 cm; Howell and Towle, 1976). The concept of mean average rainfall, however, is of limited value in the British Virgin Islands; in 1933, for example, the total rainfall was 94 inches (239 cm), whereas in 1973 it was only 31 inches (79 cm). In addition, the monthly distribution is uneven: in 1974, of a total rainfall of 53 inches (135 cm) recorded in Road Town, 83 percent fell in the last five months of the year (British Virgin Islands, Agricultural Department, 1975).²

The amount of rainfall received by areas outside of Road Town is subject to some speculation. In the British Virgin Islands Physical

Development Plan (United Nations Development Programme, 1976, p. 8), it was estimated that rainfall averages about 40 inches (102 cm) in coastal areas, but that the more mountainous areas receive over 70 inches (178 cm) per annum. Beard (1949, p. 175) premised that rainfall in the Mount Sage area could possibly exceed 80 inches (203 cm). As mentioned by Bowden, however, (1970, p. 14), Beard's estimates were based on comparison with similar heights in Tobago, which generally experience a wetter rainfall regime. In Bowden's opinion, Mount Sage generally receives a lower amount -- possibly 60 to 65 inches (152 to 165 cm) -- with much of the mountain ridge experiencing an average annual rainfall of between 55 and 60 inches (140 and 152 cm). In the drier, lowland, eastern areas of the island, he estimated that rainfall probably is less than 40 inches (102 cm), and on Beef Island even below 35 inches (89 cm; 1970, p. 14). Since they were the most comprehensive available to the author, Bowden's estimates were used for inclusion in the OASYS program, and are shown in Figure 10.

Any practical interpretation of the annual rainfall estimates for Tortola should take into account the fact that a large proportion of the rain falls in light showers and brief sprinkles:

Many of these light rains are measured in the rain gauges and they augment the total rainfall out of proportion to their significance for crop growth and for vegetation, because they barely wet the vegetation and the top of the soil and do not sink into it, and so are quickly evaporated by sun and wind. (Stone, 1942, p. 27)

Moreover, when rainfall occurs in short, heavy showers during the wet season, the runoff is so rapid that the soil receives little moisture. It is not surprising, therefore, that Stone wrote:

. . . the roughly 45 inches of measured average annual rainfall in the Virgin Islands is by no means the equivalent for plant growth of 45 inches of measured precipitation in rainier

LEGEND

- 1. < 35" per annum
- 2. 35 - 39" per annum
- 3. 40 - 44" per annum
- 4. 45 - 49" per annum
- 5. 50 - 54" per annum
- 6. 55 - 60" per annum
- 7. > 60" per annum
- 8. served by water mains



Figure 10: Parameter Rainfall (after Bowden, 1970)

parts of the West Indies or in the southern United States.
(1942, p. 30)

Water Supply

As a consequence of the varying rainfall, large fluctuations in ground water reserves occur. The latter are held mostly in the Upper Cretaceous and Eocene bedrock and within superficial deposits, whereas within the stratified metamorphosed volcanic rocks they occur only in fractures and joints (Mather, 1971). Research undertaken by Jordan (1966) in St. Thomas suggests that water recharge to the bedrock may occur only once or twice each year as the result of a downfall of over 2 or 3 inches (5 to 8 cm) within a 24-hour period. Less heavy rainfall is dissipated by run off, evaporation and soil intake, although alluvial aquifers are partially recharged.

The limited ground water that exists may become contaminated during times of drought because of the high saline content of the bedrock. In addition, the ground water in the eastern parts of Tortola appears to be connected to the adjacent sea water, and overpumping could cause saline water intrusion. On Beef Island, reserves of potable water have yet to be discovered (Howell and Towle, 1976).

For most of the island's residents, the limited ground water reserves pose no particular threat to their water supply, since rainfall catchment systems such as cisterns and drums primarily are relied upon.³ In the major urban settlement of Road Town, however, which is served by the island's only mains system, the efficacy of these reserves is important. Three main wells produce approximately 100,000 to 150,000 gallons per day (380,000 to 570,000 l), which is usually sufficient for the inhabitants' needs. During periods of prolonged drought, however, the quantity of water remaining in the alluvial aquifer can become so

reduced as to necessitate the rationing of water.⁴ According to the United Nations' Physical Development Programme (1976, p. 13), it is projected that the total supply for an extended main system to serve both Road Town and East End/Long Look will eventually approximate 400,000 gallons (1,500,000 l) per day; it can be anticipated, however, that a general scarcity of water will continue to be one of the island's greatest physical limitations to the future development of tourism.

Vegetative Cover

Owing to Tortola's low rainfall and poor, permeable soils, its endemic vegetation is naturally xerophytic in character. Once extensive forests have almost totally been removed, either because of clearing for agriculture pursuits, for timber supply or for the manufacture of charcoal (United Kingdom Foreign and Commonwealth Office, 1976 p. 59). The resulting landscape is one primarily comprising secondary woodland and scrub and rough pasture, as denoted in Figure 11. According to estimates by the United Nations' Physical Development Programme (1976, p. II.4), of the island's total area of 14,636 acres (5,923 ha) some 33 percent presently is in scrub, 36 percent in pasture and arable land, 27 percent in woodland, 3 percent in mangrove, and less than 1 percent is classified as "urban."

Packer (1973) identified three broad zones of vegetation that are characteristic to the island. The first is contained in the littoral region, which is generally rocky and cliffy in nature, but diversified by occasional beaches and salt swamps. Along the rocky stretches, the steep slopes support thickets of mixed thorn scrub, conspicuous among which are the stubby, pale bark tree, Pisonia subcordata, and the reddish, papery barked Bursera simaruba. In addition, the white flowered indigenous

LEGEND

1. Cultivated
2. Scrub
3. Woodland
4. Forest
5. Mangrove
6. Bare rock
7. Beach
8. Predominantly urban



Figure 11: Parameter Land Use, 1975

frangipani (Plumeria alba L.), together with various cacti such as Opuntia aff ribescens are common.

The sandy beaches are often fringed by Coccoloba uvifera, the sea-beam, Canavalia maritima, planted Cocos uvifera, Terminalia catappa and coarse grasses, including Spartina patens. Associated with the salt swamps and lakes are found small patches of stunted mangrove (Rhizophora mangle spp and Avicenna germinans), although in the past many of these areas have been sacrificed for land reclamation. In the raised, drier areas around the salt lakes are found various cacti such as Cephalocereus and Opuntia, as well as Agave karatto and Aloe Vulgaris.

The second vegetative zone distinguished by Packer occurs at medium altitude, ranging from 200 to 1,000 feet (60 to 300 m). In the few areas where the indigenous cover persists, as in the most eastern parts of Beef Island, it is described as:

. . . generally of rather dry aromatic thorn scrub, often festooned with bromeliads above a few hundred feet, and supporting purple ground orchids. (Packer, 1973, n.p.)

It is in this zone where agricultural pursuits generally have been most prevalent, resulting in a highly diversified patchwork of scrub, pasture and cultivated land, as depicted in Figures 12 and 13. Commonly, during land clearing, some of the larger trees (such as Pisonia subcordata and Bursera simaruba) are left standing. When the land is abandoned after a few years of cultivation and reverts to bush, an invasive thicket fills up between these trees. In drier, rockier areas, the initial thicket is formed chiefly of croton bushes (mainly Croton rigidus), whereas in moister areas the Asiatic shrub Leucaena glauca is more typical (United Kingdom Foreign and Commonwealth Office, 1976, p. 59).

According to the 1961 Census of Agriculture -- the most recent available -- approximately 4 percent of the total area of 8,683 acres



Figure 12: Upland Tortola. The highly disturbed, checkerboard pattern of predominantly scrub and pasture is characteristic of interior areas, even on steeply inclined slopes as in center left of the photograph.



Figure 13: Field Rotation. Within an acre of land, newly cultivated plots, pasture and fallow are all discernible.

(3,514 ha) then in agricultural holdings was in tree crops. This proportion probably has not decreased significantly since that time, and it is common to find such trees as mango (Mangifera indica), mamey (Mammea americana), avocado pear (Persa americana), soursop (Annona muricata), guava (Psidium guajava), pawpaw (Carica papaya), breadfruit (Artocarpus altilis) and sugar apple (Annona squamosa) in isolated stands or clustered along property lines.

A much greater proportion (55 percent) of all agricultural holdings in 1961 were under cultivated or uncultivated grassland. Because of the rapid decline in the livestock industry during the 1960's, however (as discussed in Chapter III), a substantial proportion of this grassland has since reverted to scrub. As noted by Baynes (1970, p. 7), some good stands of Pangola grass (Digitaria decumbens stent) and Guinea grass (Panicum maximum) may be found in areas where livestock raising still prevails.

It is interesting to note that even in 1961, when the Territory's major export comprised agricultural commodities, the area utilized for ground crops represented less than 3 percent of the land in agricultural holdings in Tortola. It is doubtful whether this percentage has altered much during the interim period, and small parcels producing root crops (especially sweet potatoes and tannias), maize, guinea corn, field peas and occasional plantings of sugar cane are dispersed along the central ridge and steep flanks.

The third and final vegetation zone identified by Packer (1973) occurs at high altitude and is generally restricted to the Mount Sage area in western Tortola, although some of the larger tree species extend into the medium altitude zone along the steep ghuts and intermittent water courses. In the Mount Sage area are still preserved remnants of

the original, once extensive, xerophytic forest. The areal extent of this vegetative relict apparently has been fast decreasing until recent years. In 1954, less than 100 acres (40 ha) of the forest (only a small part of which was virgin) remained, whereas less than a decade previously some 300 acres (120 ha) were reported to have existed (Wadsworth, 1954, p. 2). By 1968, only about 13 acres (5 ha) of virgin forest were standing, although there were also a number of patches of thicket regrowth (Willan, 1968, p. 13). Because of its demarcation as a forestry area in 1955 and subsequent protection, however, it appears that the forest area since 1972 has stabilized and thicket regrowths are expanding (Howell and Towle, 1976, n.p.).

The xerophytic forest vegetation probably is unique; certainly it is claimed to have no counterpart elsewhere in the Virgin Islands, in Puerto Rico or in the Lesser Antilles (Wadsworth, 1954, p. 10). Dominant trees include bullet (Manillara bidentata) and bastard gri gri, or "gregre" (Buchenavia capitata), although many of the former have succumbed after logging activities in the area left them devoid of a surrounding forest canopy and hence subjected them to total exposure of the elements. Ashen, weathered trunks mark the landscape, decaying testimonials to a once grander forest. The forest is composed of two stories, the taller of which is about 60 feet (18 m) in height, with the lower storey comprising a discontinuous layer of shade-loving species. The buttressed trunks of the older trees support abundant bromeliads, broad-leaved creepers and orchids (Packer, 1973, n.p.).

Since 1958, approximately 90 acres (35 ha) in the Mount Sage area have been used for the planting of exogenous tree species for the production of timber. The saplings have done surprisingly well, with a survival rate of up to 85 percent in favored areas. Three mahoganies

have been introduced -- the West Indies mahogany (Swietenia mahogani), the Honduras mahogany (S. macrophylla), and a putative hybrid of these two species originating in St. Croix -- as well as the blue mahoe (Hibiscus elatus). It is probable that future years will witness a reafforestation of similar timber-producing trees in other areas of upland Tortola.

Summary

It may be evident that Tortola's limited physical base does not lend itself too kindly to large-scale forms of development. Its lean soils, rugged topography and low rainfall delimit the possibilities not only for the extensive pursuit of agriculture but also of tourism. Its severely demanding attributes require the careful consideration of potential alternative developments; any chosen development will have to be nurtured to produce indigenous varieties capable of conforming with the physical realities of the island.

Notes

1. Although not of a climatic character, the only other natural phenomena capable of causing extensive damage are earthquakes. The Territory does lie within an earthquake belt, and minor tremors are felt frequently, but no serious earthquake damage has every been recorded.
2. During the author's study period of July, 1974, to June, 1975, the total rainfall was 55.1 inches (140 cm), but of this almost half (22.6 inches or 57.5 cm) fell during the two months of October and November (British Virgin Islands, Agricultural Department, 1975).
3. A survey in 1971 found that 66 percent of all premises in Tortola were served by a water cistern, 22 percent were served by drums and only 11 percent utilized a main water supply (British Virgin Island, Medical and Health Department, 1971).
4. In mid-July, and again in May, 1975, a periodic distribution of water was introduced for a total of eleven hours each day, and residents were asked to conserve their water. Ironically, upper residential sections of Road Town have been subject to severe flooding during the rainy season ever since the natural stormwater

channel that originally served the area was filled in at the time of the construction of Wickhams Cay and replaced by artificial channels following an altered course. Remedial drainage work occasionally has been undertaken, but so far it has proved insufficient to totally prevent periodic flooding.

CHAPTER III SOCIAL AND ECONOMIC PARAMETERS

Introduction

Over the last three centuries the British Virgin Islands have experienced marked economic and consequent demographic fluctuations. Even at the height of its past economic prosperity, Tortola's natural physical constraints proved to be inhibiting factors, mollifying the rich rewards from slavery that occurred in more fortunately endowed West Indian islands. An understanding of existing demographic trends and economic problems besetting Tortola can be achieved only by an acquaintance of the past history of the island.

Economic and Demographic History

Prehistory

Little is known of the original inhabitants of Tortola. Hatt (1924, p. 31) postulated that the Virgin Islands' prehistory falls into three periods: a postulated preceramic culture; an early ceramic culture derived from the lesser Antilles; and a late ceramic culture derived from the Greater Antilles.¹ The last inhabitants were probably Taino, as suggested by the few Arawak artifacts discovered in the Road Bay area and at Cane Garden Bay (Howell and Towle, 1976, n.p.). Whatever their population, the Amerindians apparently did little to disturb the environment around them, and their settlements were transitory; in 1596, the Earl of

Cumberland described the islands as "wholly uninhabited, sandy, barren, craggy" (quoted in Lewisohn, 1966, p. 7).

Post-Columbian Initial Occupance

Europe's discovery of the Virgin Islands has been traditionally credited to Christopher Columbus, who passed by on his second voyage to the New World. It has been suggested that the islands were given their name of Las Virgines by Columbus, who apparently was reminded of St. Ursula and her hapless 11,000 virgin followers put to death by the Huns (Lewisohn, 1966, p. 5).

The Spaniards themselves appeared to be little interested in settling Tortola, although they gave the island its name, which translated means "land of the Turtle Dove." The first settlers were actually a motley, multiracial band of pirates, who discovered that West End was an ideal base for the purpose of marauding passing merchant ships (Lewisohn, 1966, p. 8).

The first permanent settlement on Tortola was undertaken in 1648 by the Dutch, who became the island's first de facto owners. After eighteen short years, however, a band of buccaneers, dubiously calling themselves Englishmen, drove out the settlers, and with alacrity the Crown claimed Tortola as a British possession (Lewisohn, 1966, p. 10). Short-lived occupations by both French and British settlers followed, each usurping the other, and it was not until the end of the 17th century that any long-lasting colonization evolved.

The Plantation Era

After the British Virgin Islands as a whole were formally annexed to the Leeward Islands in 1672, planters gradually made their way over from Anguilla. As one contemporary writer stated:

This busy and industrious race of men were not deterred by the amazing craggy rocks and towering mountains, without one river and very few springs of good water. In a few years from the incessant toil of these people, cotton and sugar-cane might be seen flourishing from the sides of the mountains and in the lowlands ginger was cultivated and indigo works appeared. (Suckling, 1780, p. 4, quoted in Harrigan, 1971, p. 75)

By the time of the first Census in 1717, the initial importation of African slaves to work the expanding plantations had already commenced. According to that Census, the population for all the Islands comprised 795 whites and 547 blacks; by 1720, these numbers had increased to 1,122 and 1,509, respectively (Harrigan and Varlack, 1975, p. 193).

Throughout the 18th century, Tortola gradually increased its production of cotton and sugar, resulting in some local prosperity. A report in 1740 by a gentleman named Dinwiddie to the Lords Commissioners for Trade and Plantations computed that the "natural and improved" annual produce of Tortola in sugar, molasses, rum, cotton, lime juice, ginger, indigo, coffee, aloes, pimentos, turtle shell, mahogany, timber and plank amounted to the value of 30,000 pounds sterling (Jenkins, 1923, p. 95). With increasing commercial production, the population also increased. By 1805, the Islands harbored 10,520 persons (1,300 whites and 9,220 blacks; Harrigan and Varlack, 1975, p. 193) -- a population total not to be surpassed until the 1970's.

The Slow Decline

Jerrard John Howard, ship's surgeon, described Tortola in 1793 as:

. . . well nigh the most miserable, worst inhabited spot in all of the British possessions. . . . Even this unhealthy part of the globe appears overstocked with each description of people except honest ones. (quoted in Lewisohn, 1966, p. 53)

When he made his damning indictment, in fact, Howard was viewing Tortola at the apex of its plantation prosperity. For, with the 19th century, came creeping economic decline -- the outcome of prolonged wars and disrupted markets, racial strife and frequent periods of drought. The land had always been marginal for plantation agriculture, and Tortola never had become even prosperous enough to arouse the serious envy of neighboring European powers. Lewisohn considered that the estates were unlike those on the larger, wealthier islands:

The wealthiest planters owned 1,000 slaves but there were probably not more than a dozen truly rich planters on Tortola and a dozen more who could qualify for the well-off bracket. (1966, p. 95)

The capital to weather adverse economic trends was thus never accumulated, and most estate families were ill-prepared to meet any serious setback.

Disasters and crises in one form or another plagued the planter ruling class with overwhelming frequency. The hanging in 1811 of a wealthy planter, Arthur Hodge, for the murder of a slave was an act unprecedented in the West Indies and, according to Harrigan, "race relations were never the same again" (1971, p. 77). About the same time, the islands suffered a severe drought -- so much so that scarcely one-fifth of Tortola remained under cultivation by 1815 (Lewisohn, 1966, p. 56). The drought, in turn, was followed in 1819 by the worst of a number of hurricanes which caused extensive damage on Tortola. Many of the planters thereafter gave up in despair and departed from the colony:

. . . some selling their estates, others losing them for arrears of taxes, and still others becoming absentee landlords with local attorneys. (Lewisohn, 1966, p. 56)

In 1831, a slave plot to kill the white men was discovered, persuading still more of the latter to leave; by 1834, only 477 whites remained on the Islands (Harrigan and Varlack, 1975, p. 193).

Emancipation of the slaves in 1834 surprisingly changed relatively little. The former slaves continued to work on the plantations, except that they were now paid sixpence sterling a day in addition to their free cottages, provision grounds and pastures for their stock (Lewisohn, 1966, p. 57). Gurney (1840, p. 31) concluded that freedom "was working well in Tortola," and pointed to the large decrease in crime that had occurred since emancipation in 1834. Writing in the same year, however, Smith observed: "They are free, it is true, but they are poor and indolent" (1840, p. 79). Moreover, he continued:

. . . in all probability the islands would be abandoned by the planters in five years. I hardly met any individual who was not disposed to remove to the United States. (1840, p. 79)

Certain of the island's inhabitants had already accepted the merits of gaining their income elsewhere. Emissaries from Trinidad were luring the peasantry to that country with promises of higher wages (Gurney, 1840, p. 33). Also, people from the "African Location" (the inhabitants of Kingstown, Tortola, who had been freed from slave ships by the British Navy before being indentured) were finding more adequate wages in the neighboring Danish possessions:

They go to the city of St. Thomas as servants, pick up a little money, return home and remain idle until it is spent. (Smith, 1840, p. 82)

This infant, transitory migration was to augur a similar, far greater movement in the 20th century.

Of more serious economic consequence to the planters than emancipation was the passing of the Equalization Act in 1846, which abolished the

prohibitive and discriminatory duty hitherto levied on foreign sugar entering Britain. The wage-paying sugar planter was thus exposed to the competition of foreign slave-grown sugar. By 1850, there were few landed estates in Tortola which were not heavily indebted to the Liverpool and Bristol merchants who, before the coming of joint stock banks to the Caribbean, had made advances to the planters against the security of their crops.

The long-dying sugar industry eventually succumbed in 1853. A tax imposed upon cattle -- almost all of which were peasant owned -- resulted in a full insurrection, with the emptying and burning of greathouses, the destruction of sugar fields and the demolition of the sugar works. In panic, almost all of the remaining white population fled, and the land gradually reverted to bush.

Peasant Subsistence

By 1860, the population had become a peasantry of former slaves depending on the subsistence production of livestock, ground provisions and fish, and so it persisted for the rest of the century. Many left the Islands completely: in the 1901 Census, the population comprised only 4,908 persons, of which two were white -- the president and a doctor (Harrigan, 1971, p. 78).

The fall of the British-controlled plantation agriculture, according to Augelli (1956, p. 47), hastened the severing of the Islands' ties with Britain. Their closest British neighbors -- Antigua, St. Kitts and Anguilla -- lay well over a hundred miles away, and had little use for the small surplus of cattle and the large surplus of labor that the British Virgin Islands could offer. By 1900, the total export and import trade amounted to 6,199 pounds sterling (Harrigan, 1971, p. 90), or just

over one pound five shillings sterling per inhabitant. An agricultural report for the years 1906-7 aptly summarized the past century:

The history of the British Virgin Islands since 1815 has been one almost uninterrupted record of retrogression and decay, broken only for an instant by the exceptional situation caused by the American Civil War, when cotton was for a few years shipped from here and sold at famine prices in England. The short revival of prosperity was followed by perhaps the three most helpless decades of their history . . . the former labourers . . . raised degenerate stock and subsisted on fish and root crops, with the help of a certain amount of sugar and bad rum made for local consumption. (British Virgin Islands, Agricultural Department, 1908, n.p.)

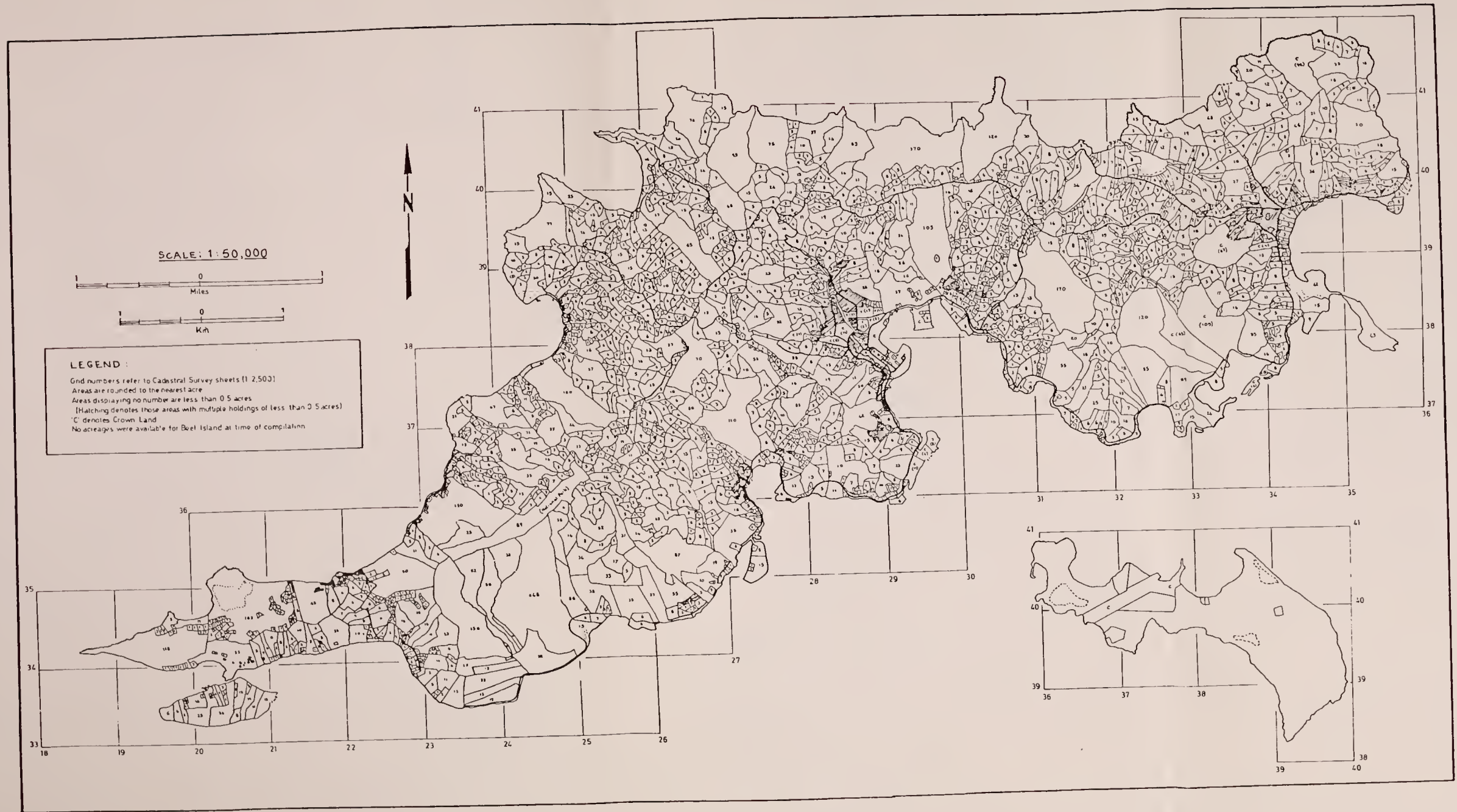
As might be expected, the change from plantation to peasant agriculture substantially altered land holding patterns. Originally extensive properties were subdivided amongst peasant farmers and, in turn, subdivided amongst their heirs. Figures 14 and 15 eloquently portray the degree to which property holdings have altered during a period of less than two centuries.

Old Problems in a New Century

Poverty had reached such abysmal depths by the beginning of the 20th century that the British Government "belatedly bestirred themselves" (Harrigan and Varlack, 1975, p. 115). An Agricultural Experimental Station was established in 1901 in Road Town, with the aim of introducing and encouraging new economic crops. To this end, improved strains of limes, coconuts and vegetables were introduced, but the major effort was directed towards the expansion of cotton, sugar and tobacco (Dookhan, 1975, p. 228).

Within a few short years, cotton in particular proved of considerable benefit and became second only to livestock among exports. In the year 1908, approximately 42,000 pounds (19,000 kg) were exported from the Islands (Dookhan, 1975, p. 228). By 1920, however, the boom collapsed because of unfavorable marketing conditions and farmer resentment toward

Figure 14: Land Tenure, Tortola, 1798



the rate of returns, but primarily because the crop had become heavily infested by the pink bollworm and cotton stainer. Extensive cotton cultivation was once again revived in 1935, but the outbreak of World War II and a consequent major outmigration of laborers curtailed production permanently.

The encouragement of sugar production met with even less success, since the quality of the crop could not compete with imports from the other Leeward Islands. Production ceased in the 1920's, except for canes grown solely for the manufacture of rum. A renewed interest in this latter activity occurred during the prohibition era, when 'the gentleman from Tortola' would come discreetly knocking on doors in the American Islands, carrying a "bulgy, dirty, sea-soaked sack filled with multiform bottles under a sparse cover of charcoal" (Knud-Hansen, 1947; quoted in Harrigan and Varlack, 1975, p. 120). Likewise, tobacco cultivation enjoyed initial success in the 1920's, but soon succumbed to the tobacco beetle and the unfavorable international market created by the world depression of 1929 - 1932 (Dookhan, 1975, p. 229). Although of traditional importance to the economy, little attempt apparently was made to improve the livestock sector other than occasional importation of breed animals. All attempts by the inhabitants to increase their well-being through agriculture were, however, thwarted by the severe hurricanes of 1916 and 1924, both of which caused extensive damage.

In the face of such adversities, the Islanders looked abroad for remuneration. St. Thomas lay barely 10 miles (16 km) away, with opportunities not only as a market for cattle but also for employment. Although adversely affected by the decline of sugar (the population of the island fell from 14,000 in 1835 to 11,000 in 1901; Proudfoot, 1950, Table 2), St. Thomas retained some of its prosperity because of its docks

and coaling station, which continued to enjoy busy service. The sugar fields of St. Croix also offered some employment, but the industry was slowly declining by the 20th century. Those unable to find work in the neighboring islands became crew members on the ships calling at Charlotte Amalie, or they migrated elsewhere, to destinations such as Colon for work on the Panama Canal, to Haiti, Cuba, the Dominican Republic and Puerto Rico for work on the sugar estates, and to the United States. Remittances to their families in Tortola and the money that they brought home were important contributions to the local economy.

The changeover from Danish to United States rule in 1917 little affected the British Islanders' temporary migration to St. Thomas and St. Croix at first. In 1927, however, immigration laws came into effect in the American territory, preventing the seasonal employment of British Islanders in St. Croix for the cutting of sugar cane; they were, instead, replaced by migrants from Puerto Rico.²

The first marked improvement in economic conditions for Tortolians came with the outbreak of World War II and the construction of a United States naval base in St. Thomas. During the period 1940 - 1946, about 3,700 workers from the British Virgins -- almost the entire labor force -- were employed either directly or indirectly in constructing or servicing the base (Proudfoot, 1950, p. 32). The end of the war, however, inevitably brought economic problems and readjustment for the number of Islanders who had for four or five years become accustomed to full employment and high wages.

The war period did produce one longer-lasting trend. The demand for meat in St. Thomas led to an increased emphasis on livestock production in Tortola, to the detriment of agricultural cropping. Promotion and improvement of the livestock industry became the Government's main

planning objective in the immediate post-war years. Red Poll cattle were imported and the Nellthrop breed developed to improve the quality of livestock. In addition, increased attempts were made to promote grassland management and soil and water conservation. That this program was successful is evidenced by livestock census figures: the 4,500 head of cattle counted in 1946 had increased to 6,000 in 1962. Increases in other livestock were more remarkable: whereas there were 668 pigs in 1946, there were 5,000 by 1962; the number of sheep increased from 710 to 2,500, and goats from approximately 3,000 to 10,000 (British Virgin Islands' Livestock Census; quoted in Dookhan, 1975, p. 231). By 1951, livestock accounted for 85 percent of total exports.

An agricultural renaissance proved insufficient, however, to prevent the presidency from impending bankruptcy. Its financial woes certainly were not aided by serious trade restrictions imposed on produce exported to the principal market of St. Thomas in 1950, nor by the later suspension by that island of cattle shipments from the British Islands.³ By 1951, the first grant-in-aid from the British Government was requested, and such requests became larger as the decade wore on:

Between 1956 and 1959 the relationship between grants-in-aid and local revenue had risen from 54 to 66 percent due to a decrease in local revenue. In 1960, although revenue had increased by some \$25,000, the grant-in-aid was up to 71 percent due to increased expenditure. (Harrigan and Varlack, 1975, p. 129)

The underlying and increasingly serious problem was simply that the Islands were fast becoming anachronistic in an ever-changing and more complex world. Augelli considered that their economy had undergone "only moderate change" since the late 19th century:

Its mainstay continues to be a semi-subsistent peasant agriculture with emphasis on stock raising; it is still plagued by a large surplus labor force, compelled to seek

employment outside the presidency; its dependency on St. Thomas is constantly increasing. (1956, p. 49)

As an example, Augelli cited the fact that during the previous decade the imports of the British Islands from their American neighbors had been averaging more than 75 percent of the total, and exports to these islands more than 95 percent of the total (1956, p. 51).

The hopes of economic revival -- at least through agriculture -- became increasingly forlorn, and out-migration became more entrenched as a part of the pattern of life:

It was the ambition of every parent to send away as many of his children as possible and of every youth to leave if he could - first to St. Thomas and later for the United States of America. (Harrigan and Varlack, 1975, p. 91)

It was estimated by one author in the mid-1950's that there were as many -- if not more -- British Virgin Islanders living in Greater New York than in the Islands themselves. He continued:

In fact, the major export of the islands is population and the ancillary industry, the "fixing of papers", is an occupational disease. (Todman, 1955, p. 92)

In Tortola, Road Town was undergoing an artificial and unhealthy growth (Augelli, 1956, p. 54), with the bulk of the increase in population waiting for entry or re-entry into the U.S. Virgin Islands.

The ties between the British and American possessions had become both varied and mutually binding. Whereas St. Thomas was largely urban and required livestock and food products as well as cheap labor to fill the jobs that American Islanders themselves did not want, the British Virgin Islands were primarily rural, and offered surpluses of both. For the Tortolian, whose home was in a British island but whose prosperity lay in an American one, it thus was not surprising that his toast became

"God save the Queen, but God bless America" (Harrigan and Varlack, 1975, p. 179).

The Era of Tourism

The Early Years

Although perfunctory official interest in tourism had been displayed as early as 1953 with the passing of an Hotels Aid Ordinance, the industry remained of distinctly peripheral importance throughout the 1950's within the British Islands. Portending later trends, a small, exclusive club operated on Guano Island (located just to the north-east of Tortola) for those few Americans who could afford it, and by the end of the decade Road Town could boast of two hotels, each offering six, or less rooms. The few visitors who came necessarily confined themselves primarily to their yachts.

Within neighboring St. Thomas, however, the year 1955 marked the beginning of a boom in tourism. In that year, some 82,000 tourists visited the American Islands, and by 1968 the number had increased more than tenfold to 900,000 (Robinson Smith, 1975, p. 5). The resulting job opportunities for British Virgin Islanders proliferated, especially since American Islanders themselves were reluctant to undertake the more menial tasks. A simplified procedure for temporary admission into the U.S. Virgin Islands -- and applicable only to British Virgin Islanders -- was adopted in early 1956, allowing migrants to be admitted for periods of up to one year for the purpose of contract employment. By the end of 1958, some 900 such migrants were residing within the American Islands (United Kingdom Colonial Office, 1959, p. 10), in addition to an unknown number of non-contract laborers and illegal entrants.

The tourism boom in St. Thomas proved to be both beneficial as well as debilitating to the Tortolian economy. According to the United Kingdom Colonial Office, the total effect was:

. . . on the one hand, to lessen the interest in agriculture, to lower productivity at a time when agricultural products command in these island higher prices than ever before, and to increase the dependence of the Colony of the Virgin Islands on the United States as a field of employment opportunity; on the other hand, the Colony has benefitted [sic] from maximum employment conditions, higher incomes and a rise in the standard of living. (1959, p. 10)

Many of the new houses that were constructed in Tortola at this time, as well as investments in pasture and livestock development, were in fact a direct result of a strengthened and growing St. Thomas economy. The "Yankee dollar" became so pervasive in the British colony that by 1959 it was officially accepted as legal tender.

It was not until the 1960's, however, that the tourism industry made any substantial inroads in the British Islands themselves. Their somnolence in this regard was dispelled by a concurrence of several, not wholly related, factors. The British Government, in the hope of making the Islands' economy a viable one, invested in various forms of grants throughout the 1950's and 1960's in order substantially to upgrade the almost non-existent engineering infrastructure. As rightly suggested by Dookhan, the economic goal "was not merely the development of production but the achievement of economic self-sufficiency in the shortest time" (1975, p. 231).

The capacity of the British Virgin Islands' administration to request such aid certainly was enhanced by constitutional reform. Under the Virgin Islands' Constitution Act of 1950, the power that had been vested in the Governor to legislate for the Presidency from 1902 onward was abrogated, and the previous system of a Legislative Council was restored. Later, in 1956, the Leeward Islands' Federation was dissolved,

and the Virgin Islands constitutionally became a Territory. As such, not only could the Islands' administration deal directly with the Colonial Office, but the restoration of a legislature also enabled greater local participation in the decision-making processes.

Attempts throughout the century to provide the British Islands with a firm economy based solely upon agriculture consistently had come to grief -- not only because of the more lucrative pecuniary rewards offered in St. Thomas, but also because of natural, physical constraints within the Islands. By the 1960's, the traditional policies for growth were amended:

Since the American territory was attracting away British Virgin Islanders it was necessary to develop an equivalent economy if these people were to be retained. Agriculture was unlikely to improve the local standard of living; tourism could; and besides, its development was likely to promote agriculture. . . . Consequently, in 1961 the administration accepted as a 'firm policy' the promotion of tourism as the mainspring of development. (Dookhan, 1974, p. 231)

The administration's findings were substantiated by those of O'Loughlin the following year, who outlined three possible courses of action open to the Territory: evacuation, amalgamation with the U.S. Virgin Islands, or the development of tourism to achieve economic viability and in so doing revive the lagging agricultural and fishing sectors. The Virgin Islands' Development Plan for 1963-64 incorporated O'Loughlin's recommendations, and the growth of tourism was actively pursued.

The rapid development as a tourist center of the neighboring U.S. Virgins aided the administration's aspirations in two important ways. First, merely because of their proximity, the Islands and their tourism potential became increasingly known to American investors and visitors. Secondly, the large-scale development of St. Thomas encouraged increased

investment in the British territory essentially by default. As early as 1960, Kingsbury stated:

. . . the U.S. Virgin Islands are rapidly reaching tourist saturation. Land prices are exorbitant, the best resort sites are gone, the water problem is ultra-critical, and in the opinion of many visitors, the tourist population already exceeds the catering ability and the attractiveness of the limited land area and the limited local population, at least on St. Thomas. (1960, p. 20)

As a consequence, he noted, in spite of the still limited infrastructure of the British Virgin Islands, their "problems of tourist development appear now less than further development in the American Islands" (1960, p. 20).

Perhaps more important than any of the above factors in the actual implementation of a tourism industry was the interest shown by one man -- Lawrence Rockefeller -- who was financially capable of introducing the first large tourist resort to the Islands. After a total expenditure of possibly as high as \$9 million (Robinson Smith, 1975, p. 5), Virgin Gorda's 'Little Dix Bay Hotel' was opened for business in 1964.⁴ The subsequent impact upon the economy was substantial: Phillips (1966, p. 19) anticipated that as many as 600 people would be employed as a direct result, that their annual payroll would be in excess of \$1 million, and that direct Government revenues would increase by possibly \$200,000.⁵

Rockefeller's development on Virgin Gorda spawned increasing, though less grandiose, schemes in the other Islands. By 1967, Tortola and Beef Island offered a total of 106 guest rooms, which were scattered in eleven small establishments ("Facts about the B.V.I.", 1967, p. 593), the largest of which had sixteen rooms. Almost as an obituary for things past, Fodor, Laschever and Van Doren wrote:

It probably won't be long before the British Virgins are as decked out in hotels, restaurants, nightclubs and other worldly finery as their matronly American cousins to the south. In the interim, if you are looking for a real escapist's haven, here's one of the few remaining places. (1967, p. 360)

The interim proved to be almost exceedingly short.

The Tourism Boom

The year 1967 brought both a quickening of investment and a commitment on behalf of the British Virgin Islands' Government for development schemes that were unprecedented in scale. In Tortola, the largest of these entailed an extensive landfill scheme in Road Harbour which would connect the islet of Wickhams Cay to the mainland, thereby creating a prime development area of 73 acres.⁶ The group involved in this venture also held a large interest in the Development Corporation of Anegada -- an entity that had been granted permission to develop almost four-fifths of the Territory's second largest island as a resort center.

Stimulated by a massive inflow of funds, the local economy mushroomed, increasing at an average annual rate of 20 percent between 1966 and 1968, and by 60 percent during 1969 alone. Even over the longer period 1955 to 1969 -- which included many years of relative inactivity -- the growth rate of the Islands was considered to be the highest in the Caribbean (United Kingdom Foreign and Commonwealth Office, 1973a, p. 5). Even so, during the late 1960's, it could not keep pace with tourist demand, which increased by 25 to 30 percent per annum.

With the expansion of economic activity, government revenues continued to grow, quadrupling in seven years -- from \$579,000 in 1963 to just over \$2.1 millions in 1969. Imports increased also, from \$2.3 millions to \$8.0 millions over the same period (Harrigan and Varlack, 1975, p. 32), but a healthy, overall surplus in the balance of payments was maintained.

If measured solely by economic criteria, the Government's strategy of relying upon tourism for growth had worked well and been fulfilled in a remarkably short time. By 1968, the Islands were almost totally dependent upon tourism, with visitor receipts accounting for 49 percent of the national income and almost all of invisible exports (Bryden, 1970, p. 93). According to any other criterion, however -- particularly social -- the brief boom years of 1967 to 1969 could not be regarded as wholly successful. Increased misgivings and resentment, coupled with the oncoming world recession, abruptly halted the frenetic pace of development.

Rescission and Recession

At the height of economic prosperity in 1969, resentment amongst the populace became so widespread and so vocal that the Legislative Council was forced to reconsider its stance concerning the ongoing development schemes at Wickhams Cay and Anegada.⁷ The problems arose primarily because of the nature of the Agreements themselves, poorly designed infrastructural work, the rather abrasive character of the chief developer, Mr. Kenneth Bates, and vacillation on the part of the Government.

The terms of the Anegada Agreement included the leasing of a large majority of the island for a period of 199 years -- far longer than the normal 99-year lease. The animosity of the Anegadians was aroused as soon as they realized that most of the island -- which was officially Crown Land -- would be alienated, leaving only a small area around the existing Settlement for future local expansion. The relationship between the developers and inhabitants certainly was not helped when construction of an airstrip levelled one of the most agriculturally productive areas of Anegada.⁸

The Wickhams Cay Agreement provided absolute ownership of the landfill to the developer upon completion of the work. Although there

was no provision for a cash payment, Wickhams Cay Limited was required to provide certain public services to adjoining areas of Road Town, including sewerage and drainage facilities, as well as the construction of a by-pass road. In addition, small portions of Wickhams Cay were to be reserved for public use. The Agreement included substantial import duty and tax concessions for a period of ten years after completion of the landfill.

Within Road Town, doubts were soon expressed concerning the wisdom and extent of the Agreement. One of the major fears was that Wickhams Cay would be dominated by foreign-owned businesses, so much so that it would become a wealthy, white enclave in the middle of the Territory's capital. Since the original development proposals put forward by Wickhams Cay comprised only a simple sub-division plan of land for sale, with little or no control being exerted over the type and location of development, British Islanders were given no indication as to how or what growth would actually occur. Road Town residents were particularly displeased after severe flooding occurred in May, 1969, as a result of exceptionally heavy rains but also because of inadequate and poorly laid drainage facilities on Wickhams Cay (Shankland Cox and Associates, 1972; Richards and Dumbleton, 1972).

Although no suggestion was made that contractual obligations of the companies concerned had not been fulfilled, the Legislative Council was sufficiently disturbed to request a formal commission of inquiry.

Reporting in November, 1969, the commission concluded:

We believe . . . that [the projects] can confer great and lasting benefits on the British Virgin Islands. Equally, however, we believe that no Government should surrender its control over the land and destiny of its citizens to quite such an extent as these agreements do. (quoted in "Concessions too great in Anegada and Wickhams Cay Agreement", 1970, p. 69)

Among the commission's specific recommendations were that most of the tax concessions granted be abolished, that at least one-third of Wickhams Cay be sold to British Virgin Islanders and, on Anegada, that the lease be shortened and the land area under development be reduced ("Concessions too great in Anegada and Wickhams Cay Agreement," 1970, p. 69).

The recommendations for renegotiation were not accepted by the Legislative Council, who instead decided to acquire the interest of Wickhams Cay Limited and the Development Corporation of Anegada on behalf of the Islands. After protracted negotiations, an agreement was finally reached in July, 1971, whereby settlement was made for \$5.8 million, which the British Government supplied as a loan.

Abrogation of the two agreements by the British Virgin Islands' Government dampened the desire of foreign investors to proceed with or initiate further building and development projects. This lack of confidence coincided in 1970 with an unexpected recession in tourism in the Caribbean and a decrease in long-term bank financing, in particular affecting the construction industry. The resulting impact was predictable:

Development slowed down considerably. Many expatriate entrepreneurs left the Territory and immigration figures fell. The building of hotels and tourist enterprises was stopped. Money was in short supply, the cost of living rose and there was no longer full employment. (United Kingdom Foreign and Commonwealth Office, 1973a)

Surprisingly, in spite of the worsened economic conditions, the gross domestic product increased by almost 17 percent during 1970, as shown in Table 2. By 1971, however, it had fallen by 12 percent to approximately \$14 million, and remained almost stationary throughout 1972 (Evans, 1976b, p. 3).

Table 2: Gross Domestic Product in
Producers' Values, 1963-1974
(Current Dollars)

<u>Years</u>	<u>Gross Domestic Product (\$ Million)</u>	<u>Annual Rate of Growth (Percent)</u>
1963	2.9	--
1964	3.1	6.9
1965	3.4	9.7
1966	3.9	14.7
1967	4.8	23.1
1968	6.8	41.7
1969	13.7 ^{1/}	-- ^{1/}
1970	16.0	16.8
1971	14.2	-12.7
1972	14.5	2.1
1973	16.0	10.3
1974	19.2	20.0

Source: Evans, 1976b, p. 3.

^{1/}The 1963-1968 figures are not strictly comparable to those of 1969-1974.

Although the year 1973 witnessed a moderate upturn in economic activity, full recovery was hampered by an international fuel crisis, which led to several cancelled flight schedules and a deepening recession in the United States. More significantly, the year marked an examination and reorientation of economic development policies within the Territory. The emphasis by the British Virgin Islands' Government was now placed upon revitalization of the economy through a return to agriculture and livestock, and only a carefully controlled and gradual development of the tourism sector (United Kingdom Foreign and Commonwealth Office, 1974).

In retrospect, the general consensus of opinion is that the pause in economic development during the early 1970's offered the opportunity for a much needed reappraisal of the potential and problems which were then facing the Territory. As succinctly described in the British Government report for 1970, "too much happened too quickly" (United Kingdom Foreign and Commonwealth, 1973a, p. 4). The pursuance of such large development schemes could not have occurred at a less politically opportune time. While the Wickhams Cay and Anegada Agreements were made within the esoteric confines of an administratorial system, their ramifications were imposed upon a newly constituted and elected Ministerial Government.⁹

As Batham remarked:

Unfortunately the basic legislation required to ensure efficient and smooth development was not in existence, which has meant a huge burden on the new government and an inadequate civil service. (1969, p. 563)

Such an unpreparedness, he continued, was not compatible with the ability to deal adequately with "an influx of the 'fast buck' merchants bent on taking advantage of the situation." The resentment over Wickhams Cay, therefore, was perhaps symptomatic of a larger malady afflicting the

Territory, and thus it may have been fortunate that the rescission and recession occurred at such an early stage.

Recent Development

Since 1974, despite only a partial recovery of the United States' economy, the British Virgin Islands once again have experienced significant tourism growth. In the latter year, the Territory's gross domestic product was estimated to be \$19.2 million, representing an increase of 20 percent over the year 1973 (Evans, 1976b, p. 3). As the confidence of investors was renewed, foreign capital entering the Territory increased accordingly; Kapur (1977, p. ii) has estimated that the current input of such funds is in the order of \$4 million per annum. By far the largest proportion of this investment has been directed toward the expansion of the Islands' tourist infrastructure, primarily in the form of additional hotel accommodations centered in Tortola. As shown in Table 3, hotel room capacity in that island doubled between 1974 and 1977, largely as a result of the opening of "Prospect Reef." In the latter year, Tortola accounted for over half of the Territory's hotel accommodation, whereas in 1973 its proportion had been only 35 percent (see Table 4). In future years, it is probable that the island will become even more important as a hotel accommodation center, with new hotels planned for Wickhams Cay as well as a further expansion of "Prospect Reef" to include hillside development of condominiums with supporting entertainment facilities (Rouchier, 1975)¹⁰.

The most dramatic increase in visitor accommodation, however, has come from the growth of charter boat operations. The number of beds/berths offered by such operations in Tortola increased from 186 in 1970 to 758 by 1976 (Lascelles, 1976 p. 9). Whereas in 1974 more tourists stayed overnight in hotels than on chartered boats (14,656 versus 13,463,

Table 3: Hotel Room Capacity, Tortola, 1960-1977

	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977
Fort Burt	6	6	6	6	6	6	7	7	7	7	7	7	7	7	10	10	10	10
Treasure Isle	5	11	11	11	11	17	17	17	17	17	32	32	32	32	40	40	40	40
Sea View	-	-	6	8	8	8	8	8	8	8	8	8	8	8	8	8	8	12
Long Bay	-	-	-	-	16	24	24	24	24	24	33	33	33	33	33	33	33	33
Sebastians	-	-	-	-	-	-	-	-	10	10	10	10	10	10	10	12	13	17
Colonial Manor	-	-	-	-	-	-	-	-	13	13	13	13	13	13	12	13	-	-
Smuggler Cave	-	-	-	-	-	-	-	-	-	5	5	5	5	5	5	5	5	5
Fort Recovery	-	-	-	-	-	-	-	-	-	-	6	6	6	-	-	-	-	-
Sugar Mill	-	-	-	-	-	-	-	-	-	-	-	-	5	5	17	17	18	18
Prospect Reef	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	20	50	105
Caribbean Service Yachts	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	8	8
Village Cay Marina	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	13	13
Castle Maria	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	9
Total	11	17	23	25	25	47	56	56	79	84	114	114	119	113	135	156	198	270

Source: Evans, 1975c, p. 43.
 Lettsome, 1977b, p. 58.
 The Welcome Tourist Guide, 1978.

Table 4: Hotel Room Capacity
by Island; 1970-1977

<u>Island</u>	<u>Years</u>							
	<u>1970</u>	<u>1971</u>	<u>1972</u>	<u>1973</u>	<u>1974</u>	<u>1975</u>	<u>1976</u>	<u>1977</u>
Tortola	114	114	119	113	135	158	198	270
Virgin Gorda	108	108	108	146	148	148	150	150
Other	31	67	67	67	67	67	67	87
Total	253	289	294	326	350	373	415	507
Percent of Total in Tortola	45.1	39.4	40.5	34.7	38.6	42.4	47.7	53.3

Source: Lettsome, 1977b, p. 59.
The Welcome Tourist Guide, 1978.

respectively), the position had reversed itself by 1976, when 17,096 tourists stayed in hotels as compared to 21,901 on charter boats (Lettsome, 1977b, p. 49). A summary of the recent growth of charter boat operations in Tortola is given in Table 5.

Since 1974, total tourist arrivals have been increasing at a high rate of almost 10 percent per annum, numbering some 70,300 in 1976 (see Table 6). Visitor expenditures have been rising even more rapidly -- from \$10.0 million in 1974 to \$14.5 million in 1976, representing an annual increase of 22 percent (Lettsome, 1977b, p. 67). In spite of this significant growth, however, the tourist sector has consistently been incurring operating losses; in 1975, for example, these amounted to \$1.5 million (Evans, 1976b, p. 5). The Territory's economy thus presents an intriguing and disturbing anomaly:

The operating losses of tourist sector companies are, indeed, so large that the BVI must be unique in the world in having a Corporate Sector . . . which runs at an overall operating deficit. The problem common to most developing countries of the expropriation abroad of the large operating profits of foreign owned companies is entirely reversed in the BVI. There is, in the BVI, a sizeable inflow of money from abroad in order to subsidize the operating losses of BVI companies. (Evans, 1976b, p. 5)

Because of the negligible size of the manufacturing and primary sectors, tertiary activities in 1976 accounted for 79 percent of total gross domestic product and employed 56 percent of the total labor force (United Nations Physical Development Programme, 1976, p. 50). Since the tourism sector comprises by far the largest component of these activities, the fact that such a hefty segment of the economy should rely upon the largesse of foreign investors can only cast sobriety upon the long-term prospects of the Islands' prosperity.

Table 5: Charter Yachts Based in Tortola,
1970-1976

<u>Operation</u>	<u>Year</u>						
	<u>1970</u>	<u>1971</u>	<u>1972</u>	<u>1973</u>	<u>1974</u>	<u>1975</u>	<u>1976</u>
Caribbean Service Yachts	30	30	35	37	41	41	40
Moorings	10	12	25	24	32	36	47
Fleet Indigo			6	8	14	17	15
West Indies Yachts				9	18	17	17
Tortola Yacht Charters						5	5
Total	40	42	66	78	105	116	124

Source: Lettsome, 1977b, p. 59.

Table 6: Visitor/Tourist Arrivals by
Method of Travel, 1967-1976

<u>Year</u>	<u>By Air</u>	<u>By Sea</u>	<u>Total</u>	<u>Annual Rate of Growth</u>
1967	5,600	11,900	17,500	--
1968	11,800	11,000	22,800	30.3
1969	14,800	14,700	29,500	29.4
1970	16,200	17,000	33,200	12.5
1971	20,300	17,400	37,700	13.6
1972	23,200	20,100	43,300	14.8
1973	25,000	32,800	57,800	--1/
1974	29,200	29,300	58,500	1.2
1975	31,800	33,000	70,300	10.8
1976	36,100	34,200	70,300	8.5

Source: Lettsome, 1977b, p. 9.

- 1/ Tourist definitions were revised in October, 1972. Former 'visitor arrivals' included 'business visitors', 'other visitors' and 'temporarily departing visitors', while excluding those tourists who arrived in the British Virgin Islands in their own or foreign chartered boats. Since that date, tourist arrivals have included the latter type of tourist, but omitted the former categories.

Notes

1. A probable preceramic site in the Mount Sage area was identified by the author's committee chairman, David L. Niddrie, during a field trip in early 1975, and later verified by a visiting archaeologist. Although no excavation has been undertaken as yet, the site is potentially older than other known sites in the Virgin Islands and Puerto Rico (Figueredo, 1975).
2. The Crucians themselves at this time were moving to the towns of Christiansted and Frederiksted before again moving to the United States mainland.
3. The prevention of cattle shipments for 18 months during 1953 and 1954 was caused by the presence of Texas-fever tick in some of the livestock landed in St. Thomas. The recently passed United States law prohibiting the importation of such infested cattle was aimed primarily at controlling the movement of livestock across the Mexican border. The pest, in fact, already existed in the U.S. Virgins at the time, and the only result of the law was an increase in the price of meat in St. Thomas (Augelli, 1956, p. 56).
4. At the time, and for several years after, the hotel was the most expensive ever to have been built with regard to cost per room, and for that dubious distinction was included in the Guinness Book of Records (Robinson Smith, 1975, p. 5).
5. In order to comprehend the enormousness of these figures in relation to the British Virgin Islands' economy, it should be noted that the total national income even as late as 1947 was only \$420,000, representing a per capita income of \$64.50 (Harrigan, 1971, p. 91).
6. Reclamation work originally started in 1964, but the interest in this agreement later was purchased by another development group, known as Wickhams Cay Limited.
7. Action on the agreements originally had been taken by a previous British administrator, M.S. Stavely, with "indecent haste and relative secrecy with no real consultation" (Harrigan and Varlack, 1975, p. 172). The newly appointed members of the Legislative Council, however, initially supported the agreements.
8. No compensation was paid to Anegadians at the time nor, in fact, has been paid since that date, although the Government has expressed the desire that some form of repayment will be eventually forthcoming. The subject of compensation is still a heated one amongst Anegadians.
9. The Constitution was revised and introduced at the end of March, 1967, bringing a ministerial system into effect.

10. In light of such predominant ownership by foreign investors of the tourism infrastructure, it is encouraging to note that a few tentative steps have been made to increase local participation and ownership. A very successful hotel training course was held in Road Town for high school students during August, 1977, and further courses are planned (Colli, 1977, p. 48). In addition, a 15-unit shopping complex on Wickhams Cay is to be constructed for ownership by local businessmen, after terms for a loan of \$360,000 by the Caribbean Development Bank were agreed upon in March, 1978 (Sears, 1978, p. 30).

CHAPTER IV SELECTED IMPACTS OF TOURISM

Introduction

The previous chapter attempted to delineate some of the more important historic trends and their influence upon the economic growth of the Territory. The purpose of this present chapter will be to more closely examine some of the impacts of recent and continuing development upon Tortola's environment and social structure. The advancement made in certain sectors -- notably the provision of an improved engineering infrastructure -- will be discussed, as well as potential problems and constraints that could arise with a future growth in the tourism industry.

Infrastructural Expansion

A prerequisite for any substantial growth in Tortola's visitor industry has been the provision of an adequate infrastructure. Even as late as the 1950's, public utilities and communications could best be described as rudimentary in urban settlements and almost non-existent in the more rural areas. With subvention from the British Government in the form of Colonial Development and Welfare Funds in the 1950's and grants-in-aid during the 1960's, considerable progress had been achieved by the beginning of the present decade.

Road Transportation

One area of prime concern to the Islands' administration was the paucity of the road system. Although a road construction program was begun as early as 1953, by 1958 the whole Territory could boast of only

twelve miles (19 km) of motorable roads and 60 miles (97 km) of unsurfaced earth roads (Dookhan, 1975, p. 233). Over the next decade the road system was greatly improved, with the completion of Drake's Highway extending along the whole southern coast of Tortola and with a bridge connection to Beef Island. A combination of poor construction and adverse weather conditions resulted, however, in the need for extensive repair and resurfacing. The primary road to West End, for example, rapidly disintegrated and had to be resurfaced in 1975. Similarly, much of the Ridge Road was washed away during the heavy rains of 1970 and 1974.

Despite such setbacks, by 1976 Tortola was served with a fairly adequate road system, composed of almost 30 miles (48 km) of paved primary roads and 12 miles (19 km) of secondary roads. (Figure 16 depicts those areas with easy access to some form of transportation network.) According to the United Nations' Physical Development Programme (1976, p. 62), little further extension of the system was needed, although realignment and upgrading of various segments were desirable. Whereas the 1975 Speech from the Throne placed priority upon construction of a circular road to encompass the whole of the island, the United Nations' Physical Development Plan did not consider the cost to be justified at the time. Should the latter recommendation be accepted, it would necessarily restrict further tourism development along Tortola's northern coast in the foreseeable future.

Power Supply

Throughout the 1950's the public electricity system was confined to Road Town, and service even there was restricted and intermittent. By 1967, the first phase of a scheme to serve the whole of the Territory was completed, with the installation of a new generating plant in Road Town. By 1971, electricity supply was provided to the whole of Tortola. As

LEGEND

1. Served by major roads
2. Served by secondary and minor roads
3. Served by footpaths
5. Served by no designated road or footpath



Figure 16: Parameter Roads

shown in Figure 17, all parts of the island are no further than a distance of one mile (0.6 km) from a main transmission line. Electricity is presently supplied by three generators of 1183 Kw each and one generator of 1190 Kw capacity, all of which are situated in Road Town. According to Kapur (1977, p. 6), an adequate power supply now exists to cope with any further demand in Tortola over the short term, thus posing no problem with regard to any limited growth in tourism.

Sewage Disposal

Even today, the prevailing conditions for sewage disposal can only be described as unsatisfactory. As a result of provisions made at the time of construction of Wickhams Cay, adjacent properties were to be served by the Cay's sewer system. However, the datum level used by Wickhams Cay Limited for reclamation purposes was related to low water level, and thus the sewer lines were inadequately laid service adjacent properties by gravitational force alone (Shankland Cox and Associates, 1972, p. 80). Some of the properties, therefore, continued to discharge their raw effluent to the old shoreline, by then represented by a stagnant pool of water rarely flushed by the rains.

Since 1974, an extensive foul drainage scheme has been undertaken to remedy the situation, and at present all properties along Main Street in Road Town are served by a sewage system. Elsewhere in Tortola, however, little progress has been made. Although the Government has approved of a scheme to provide piped sewage disposal in the second largest urban settlement of East End/Long Look, no action as yet has been taken.

With regard to the more rural areas of the island, the data presented in a 1971 Medical Health Department survey are still generally valid. In that year, only 1 percent of all buildings in Tortola were served by a main sewage system, whereas 47 percent had septic tanks, 24

LEGEND

1. < 1/4 mile (< 0.4 km)
2. 1/4 - 1 mile (0.4 - 1.6 km)
3. > 1 mile (> 1.6 km)



Figure 17: Parameter Power Supply (Anderson, 1973; updated by author)



Figure 18: Ridge Road, Tortola. Mainly comprising a compacted earthen surface, the road has been subject to periodic destruction by floods. Tyre punctures and the loss of exhaust pipes are frequent mishaps encountered by travellers.



Figure 19: Road Town, Tortola. Particularly noticeable are Wickhams Cay I, supporting marina activities, and the smaller landfill scheme of Wickhams Cay II to its left.

percent has sewage pits, and 28 percent had no sanitary facilities whatsoever. In the smaller coastal villages, effluent is still emptied into the sea, whereas the bush and ghuts are used for disposal in interior areas. Unfortunately most of the effluent dumped into the ghuts is flushed down by stormwater on to the alluvial aquifers and, although percolation through the alluvium acts as a natural filter, some contamination of the groundwater inevitably occurs (Mather, 1971, p. 19).

Since a piped sewage system is restricted only to the built-up urban area of Road Town, the factor of sewage disposal was not included as a parameter for inclusion in the OASYS model. Should hotel and other resort development occur outside of the Road Town area, it would be incumbent upon the investors to provide their own private sewage disposal facilities.

Sea and Air Transportation

With scant indigenous resources at its disposal, the British Virgin Islands' economy is forced to rely heavily upon extraterritorial transportation systems to deliver both visitors and needed commodities. Until well into the 1960's, however, the necessary infrastructure to receive any significant supply of people or goods was mostly lacking.

The problem of importing shipping cargoes was overcome in 1972 with the opening of a deep water berth at Port Purcell, located in Road Harbour. Previously, freighters were required to anchor midway in the harbor and discharge cargo by means of a lighterage service -- a task that added significantly to importation costs. With an 800-foot berth, Port Purcell is capable of handling up to 150,000 tons of cargo per annum -- far in excess of present cargo unloadings totalling 30,000 to 40,000 tons annually (Kapur, 1977, p. 6).

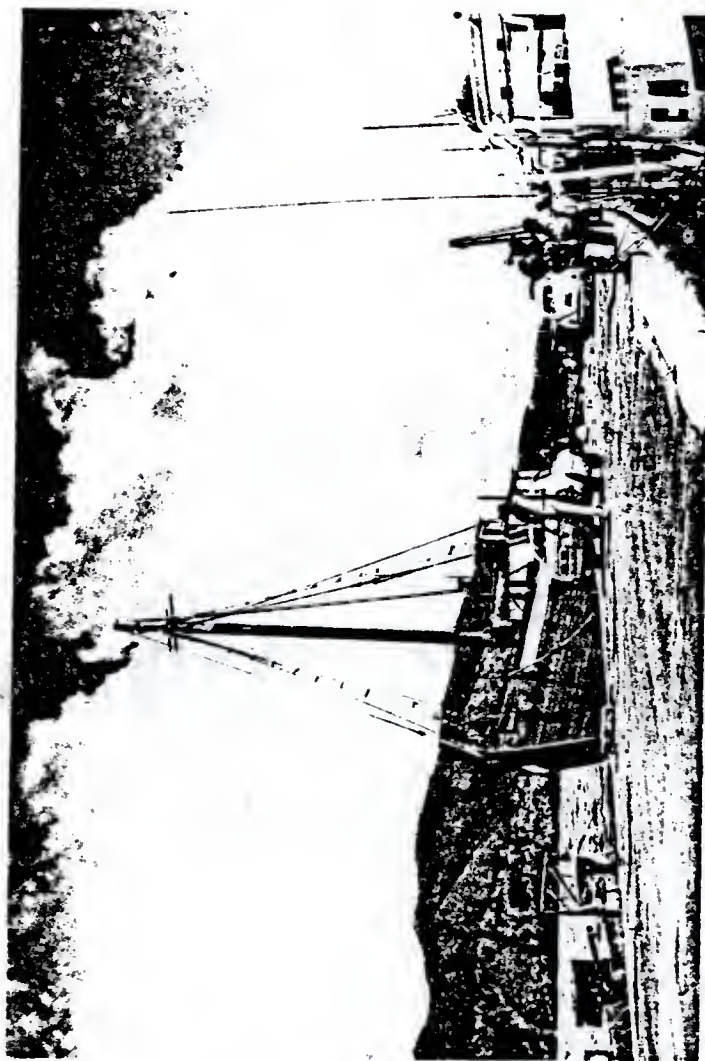


Figure 20: Road Town Pier. Traditionally the center of shipping activities before the construction of Port Purcell, the pier still caters to fishing boats, ferries, and inter-island traffic.

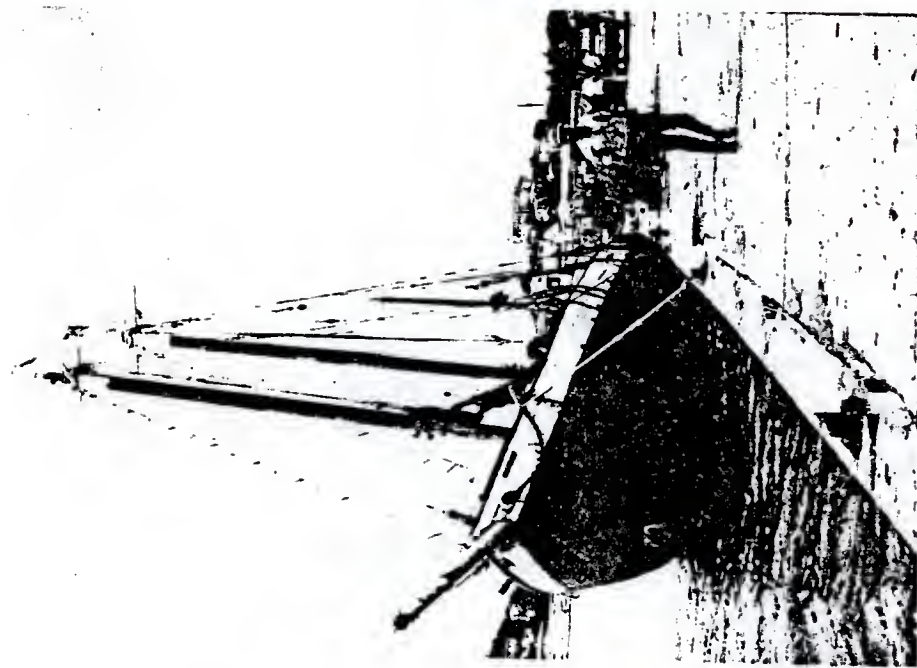


Figure 21: Tortola Ketch in Charlotte Amalie Harbor, St. Thomas. A relict of once extensive trading activities between St. Thomas and Tortola, few Tortola ketches now ply the waters between the two territories.

The commercial importation of tourists on a regular basis began in 1958, with the inauguration of a daily motor boat service between Tortola and St. Thomas. In those days, according to the United Kingdom Colonial Office (1959, p. 5), "as many as 28 tourists on a single voyage [took] advantage of a day trip to Tortola." With a gradual increase in the number of tourist visitations, various other sea services were introduced -- including one from San Juan to Road Town -- but most proved evanescent. Since 1971, the ferry Bomba Charger has provided relatively consistent service from Road Town to St. Thomas, but as of early 1978 has been challenged by another ferry of similar size and appearance that departs at precisely the same time. While the visitor can only benefit from improved services during the short-term, it is doubtful whether both operations can remain viable for long.

The capability for a limited air service was provided in the late 1950's with the construction of a small airstrip on Beef Island. By 1960, the airfield was being used by two- to eight-seater private and charter planes arriving from St. Thomas and Puerto Rico, as well as by "intermittent" flights of the Leeward Islands Air Transport Service (LIAT; Kingsbury, 1960, p. 16).

It was not until 1969, when the airstrip was extended to 3,600 feet (1,100 m), however, that regular air services from outside of the Territory were established. Today, Tortola is well-served with direct flights to Antigua, St. Maarten, the U.S. Virgin Islands and Puerto Rico. A recently completed air terminal building is capable of handling up to 200,000 passengers annually -- far greater than the number presently utilizing the airport.¹ In addition to the facilities at Beef Island, a seaplane service (allegedly the last remaining in the world) carries passengers from Charlotte Amalie Harbor in St. Thomas to Road Harbour.



Figure 22: Beef Island International Airport. Long remembered for its classic simplicity, the old airport lounge and control tower have now been replaced by new and larger facilities.

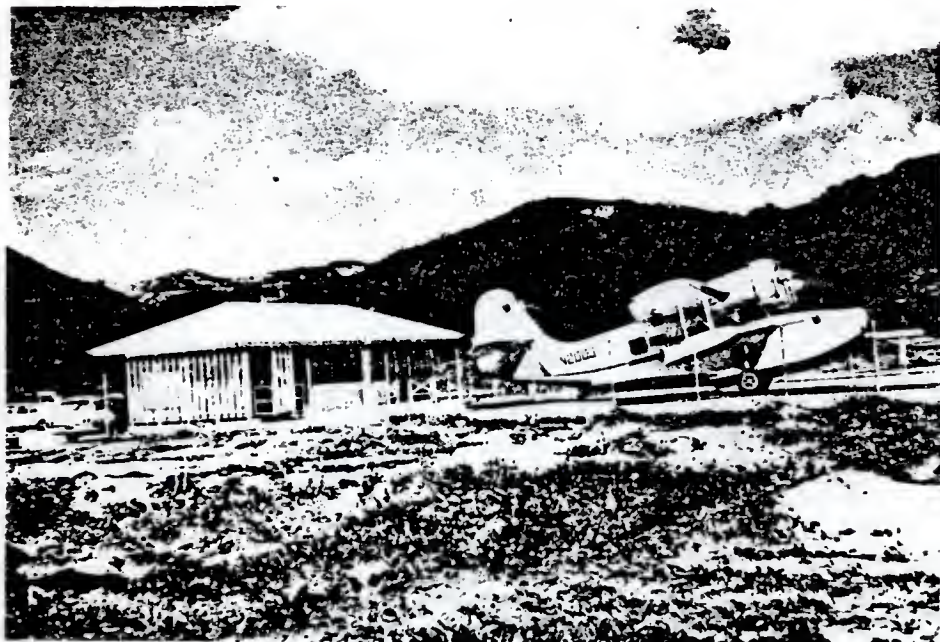


Figure 23: The 'Flying Goose', Road Town. With new facilities provided on Wickhams Cay I, relicts of World War II make frequent and memorable trips between Tortola, St. Thomas and St. Croix.

Although it may be correct to state that Tortola's airport facilities generally have kept pace with an increasing number of tourists over the years, the length of the runway precludes its use by any commercial aircraft larger than an Avro 748 jet prop, having 48 seats. Passengers departing from the United States thus have to make connecting flights from St. Thomas or Puerto Rico, while those departing from Europe are forced to change flights in Antigua. This inconvenience certainly aids the Territory's "getting away from it all" marketing program -- as well as possibly promoting exclusivity amongst its visitors -- but should, for example, St. Thomas have a particularly busy season (as it did in the winter of 1977-78), Tortola may become impossible to get to, so that the problem of "getting away" is academic.

The problem has been exacerbated in recent years by the practice of "block" booking flights by large hotels in Puerto Rico and the U.S. Virgin Islands to cater to "package tours". Should competition amongst Caribbean resorts increase -- as it may well do with the opening of Mexican and, inevitably, Cuban resorts -- more "block" booking for price-reduced vacations would almost certainly adversely affect Tortola's tourist trade because of lessened accessibility.²

Commerce and Industry

Commercial activities such as real estate, trade and finance have increased substantially with the growth of tourism, and in 1974 accounted for 36 percent of gross domestic product (United Nations' Physical Development Programme, 1976, p. 50). Even though the demand for manufactured goods likewise has risen, the industrial sector is still of only peripheral importance.

A conscious effort by both the Government and private concerns has been made to produce or process at least some of the needed materials

within the Territory. The local manufacture of concrete blocks and furniture is undertaken, aided by such legislation as the Encouragement of Industries Ordinance. The high cost of labor, however, together with the almost total lack of indigenous raw materials and an extremely limited market, severely restrict the profitability of most manufacturing enterprises. Within Road Town, adequate space for small industrial development is available on Wickhams Cay II and in the Port Purcell area. In the former area, where approximately 60,000 square feet (5,600 km²) has been reserved for industrial use, a yacht maintenance yard and a furniture factory appear to be receiving sufficient business in order to remain viable. A mineral water factory and bottling plant -- the type of industry that has been favored by experts from various development agencies (for example, Kapur, 1977) -- was established in the 1960's but is now defunct.

Mining activities within Tortola are limited and comprise the quarrying of rock at two locations for road making, building and construction. Occasional offshore dredging of sand is undertaken, with some of the largest operations in the past having been associated with landfills.³ Because of the rapidly increasing cost of imported sand, and because of the likelihood of further construction associated with an expanding tourism economy, it is probable that offshore sand deposits will be further exploited in the coming years. Lastly, a recent development has been the exploration for potential oil deposits in the shallow territorial waters, but as yet (according to the author's knowledge) no commercially viable deposits have been located.

One activity which has more direct bearing upon the tourism industry in Tortola is the recently encouraged handicrafts industry. Basket and hat weaving is a traditional Tortolian industry and is undertaken in the

East End area, but production is small and declining. Under the auspices of the International Labor Organization and funded by the United Nations Development Programme, a Handicrafts Center was established in Road Town in 1974 in order to train British Virgin Islanders to utilize various local materials such as black coral, turtle shell, wood and cow bone.

Under the guidance of a jewelry expert from Japan, the Center trained about 30 persons, but most of these, according to Kapur (1977, p. 21), have since left the Territory in search of higher remuneration in the neighboring American Islands. Although Kapur estimated that potential sales of \$500,000 annually could be achieved within the Territory, the market is thus not being met by local products and the importation of foreign jewelry and handicrafts continues.

The problems encountered by the above industry are indicative of the malaise besetting any manufacturing activity within the Territory requiring a skilled labor force. Partially as a result of historic precedent as well as because of higher wages, a Tortolian who becomes sufficiently skilled is likely to seek employment in the United States Virgin Islands. This emigration of labor can only be offset by a corresponding inward flow of workers from other, less prosperous, Eastern Caribbean Islands. In 1976, the sectors of manufacturing and motor repair accounted for only 5 percent of the total labor force (United Nations' Physical Development Programme, 1976, p. 50) and, given the physical and social constraints within the Territory, will probably remain at this low level in the foreseeable future.

Agriculture

Concurrent with the rapid increase in tourism has been the equally rapid decline of domestic agriculture. Traditionally the most important sector, its contribution to the gross domestic product fell from 21.9

percent in 1964 (Phillips, 1966) to 6.2 percent in 1968 (Bryden, 1970), until at present it has "dwindled to the status of an almost peripheral activity" (Bryden, 1973, p. 44). The developing tourism industry has not only offered higher wages, but also has competed for land and local capital resources. By 1968, most of the required foodstuffs had to be imported and at present probably less than 10 percent is home-produced (Howell and Towle, 1976, n.p.). In a quarter of a century, the Territory has changed from a small exporter of farm produce to a mass importer.

The Rewards of Tourism

As mentioned in an earlier section of this chapter, the demands of tourism upon Tortola's labor supply had begun as early as the 1950's with the expansion of the tourist industry in St. Thomas. By 1960, Harrigan and Varlack (1975, p. 130) estimated that 10 percent of the total population had found work in the U.S. Virgin Islands, and this proportion had increased to 13 percent by 1964. As a consequence, farm labor even in 1956 was almost impossible to procure. In that year, Augelli wrote:

Older people left on the land are unable to do all the work and with their small income cannot afford [the high] wages. The current trend, therefore, is to put less land in crops and more in grazing. Yet the shortage of labor affects even grazing: greater dependence is placed on planted grasses. The net result in recent years has been a less intensive use of land and consequent relative decline in the productive capacity of the local economy. (1956, p. 54)

With a tourism boom within the Territory itself during the 1960's, the labor shortage worsened. By the end of the decade, there remained no more than 100 full time farmers and perhaps an additional 140 part-time farmers and casual agricultural laborers (Evans, 1974a, p 42), as compared to 622 persons engaged in agriculture in 1960 (Evans, 1975c, p. 89). In a survey undertaken in April, 1970, it was found that only 20

percent of all farmers were less than 50 years old, and that more than 80 percent earned less than an average laborer (Elkan and Morley, 1971, p. 27).

The decline of agricultural production is reflected in part by export data for the Islands, as portrayed in Table 7. It may be seen that almost all categories declined over the period 1960 to 1970, and the exportation of live animals and rum ceased altogether. The once flourishing livestock trade with the U.S. Virgin Islands succumbed after restrictions were placed on the importation of non-United States Government-inspected materials. The only two export categories to show an increase in value over the period were fresh fish and fruit, both of which found an increasing market in the hotels and restaurants of St. Thomas.

In contrast, the value of imported foodstuffs has risen steeply, as shown in Table 8. Between 1970 and 1974, imported meats increased threefold in value, and fish almost fivefold.

An Attempted Agricultural Revival

Confronted with such depressing statistics and as part of their newly introduced policy to resuscitate domestic agriculture, the British Virgin Islands' Government initiated a "back to the land" campaign in 1974. Increased technical aid and assistance was provided to farming communities, and a government-sponsored Agricultural Fair was held at the end of the year. In addition, loans from the Caribbean Development Bank for farm improvement credit were requested and eventually approved. The campaign proved to be fairly successful, and some farmers who had given up livestock raising returned to their farms. Probably as important as government encouragement to these people, however, were the favorable rains received after the drought of 1973, high local prices for

Table 7: Composition of Domestic Exports,
British Virgin Islands, 1960 - 1974 (\$)

Year	Live Animals	Coconuts	Fresh Fish	Bananas	Other Fresh Fruit	Fresh Vegetables	Gravel and Sand	Rum	Charcoal	Other	Total
1960	127,760	2,102	13,378	8,731	3,412	9,238	3,720	6,165	2,975	4,909	182,398
1961	103,568	2,505	13,227	3,101	2,734	4,171	3,543	2,985	4,016	2,825	142,675
1962	91,600	2,651	14,361	2,521	4,527	8,016	1,491	1,551	3,057	5,882	135,657
1963	89,909	3,194	20,092	1,736	3,700	2,687	1,138	513	2,527	9,111	134,607
1964	73,861	3,398	11,322	323	2,068	1,087	330	1,750	2,455	8,605	105,999
1965	69,468	2,556	15,244	989	2,511	1,362	300	-	2,015	4,400	98,845
1966	18,782	6,885	2,919	1,648	10,447	2,815	42	360	360	26,206	70,464
1967	29,800	4,472	32,598	2,137	4,836	630	320	314	704	11,524	87,835
1968	45,505	2,978	78,017	1,345	3,497	1,173	-	-	756	11,583	144,054
1969	7,615	1,687	18,445	1,041	2,678	758	-	-	207	17,323	49,754
1970	5,955	1,995	21,607	3,386	1,225	1,922	-	-	361	6,157	42,608
1971	6,300	3,699	38,493	5,548	3,819	3,506	40,989	-	1,002	500	103,765
1972	-	4,281	28,987	6,856	3,024	4,675	22,200	-	1,642	85	71,750
1973	-	3,215	39,785	3,946	2,393	1,902	43,526	-	1,947	1,688	98,402
1974	-	2,284	28,524	-	7,583	4,511	4,461	-	2,224	3,283	52,870

Source: Evans, 1975c, p. 117.

Table 8: Composition of Imports, British Virgin Islands, 1970-1974 (\$)

	<u>1970</u>	<u>1971</u>	<u>1972</u>	<u>1973</u>	<u>1974</u>
Live Animals	-	8	195	39	558
Meats	272,964	306,970	505,300	851,110	943,558
Dairy Products	173,844	224,151	250,247	312,373	391,968
Fish	38,374	84,395	97,538	121,658	177,289
Cereals	192,729	248,126	214,187	276,561	475,117
Fruits and Vegetables	253,061	272,427	356,225	535,750	665,668
Sugar	94,218	102,043	101,008	120,109	224,409
Coffee, Tea, Spices, etc.	36,939	70,734	66,555	77,108	80,871
Animal Feeding Stuff	42,476	55,085	60,994	79,273	97,151
Miscellaneous Foods	252,180	215,762	252,827	249,469	375,970
Total	<u>1,356,785</u>	<u>1,579,701</u>	<u>1,905,076</u>	<u>2,623,450</u>	<u>3,432,001</u>

Source: Evans, 1975c, p. 118.



Figure 24: Agricultural Fair, Road Town. Well attended by both school children and adults, the 1974 fair marked renewed interest in agricultural activities.

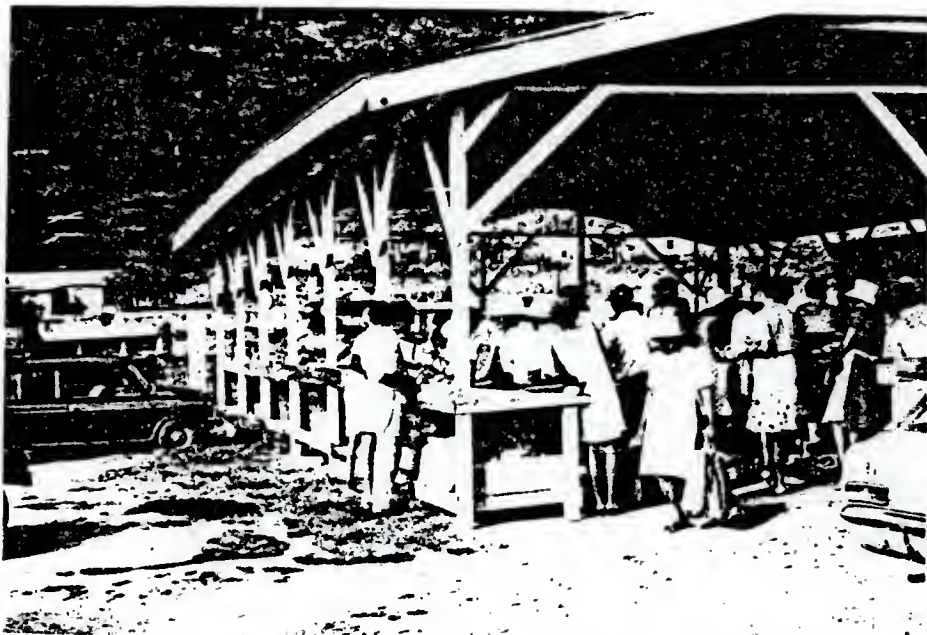


Figure 25: The Market, Road Town. Offering local vegetables, fruit and meat, the market is held early Saturday mornings. New facilities are planned on Wickhams Cay I.

foodstuffs and a scarcity of jobs in the still depressed construction sector.

Present-Day Conditions

In retrospect, the Government's efforts to revitalize agriculture appear to have had little lasting impact. In a survey of 2,544 employees conducted in June, 1976, only 23 were full-time agricultural estate managers or agricultural workers (Lettsome, 1977a, p. 5). In addition, the traditional farming practices that evolved to cope with the rugged terrain and poor soils have changed little; the description contained in the Colonial Office Lists for 1957-58 are equally as valid today as then:

All farms are . . . operated on a family basis with practically no wage labour but with a certain amount of free reciprocal farm help. Cultivation has been entirely by hand implements. The system of cultivation is shifting or rotational, alternating from food crops to pastures and ultimately to secondary bush. The cycle begins again after land has rested for a period of two to three years. There is therefore the absence of a system of permanent terraces, manuring and the systematic rotation of crops. (United Kingdom Colonial Office, 1959, p. 21)

The old people still farm, but few of the younger Tortolians have been induced back to the land. Some of the middle-aged men -- especially those living in rural areas -- do some farming to supplement their incomes derived from the construction or tourism industry. The general role of farming, however, was aptly summed up by Robinson Smith:

It is a less important alternative to most Tortolians than either emigration or wage employment. Ask a school child what he wants to be when he grows up and he will not say a farmer. (1976, p. 4)

Unless the tourism industry collapses, it is doubtful whether agriculture -- in spite of all the Government's good wishes -- will ever be a thriving sector.⁴



Figure 26: Newly Cleared Land. Note that the larger trees are left standing.



Figure 27: Cotton Bolls, Road Town. A relict of past agricultural endeavors, a cotton plant grows untended on the shores of Road Harbour.

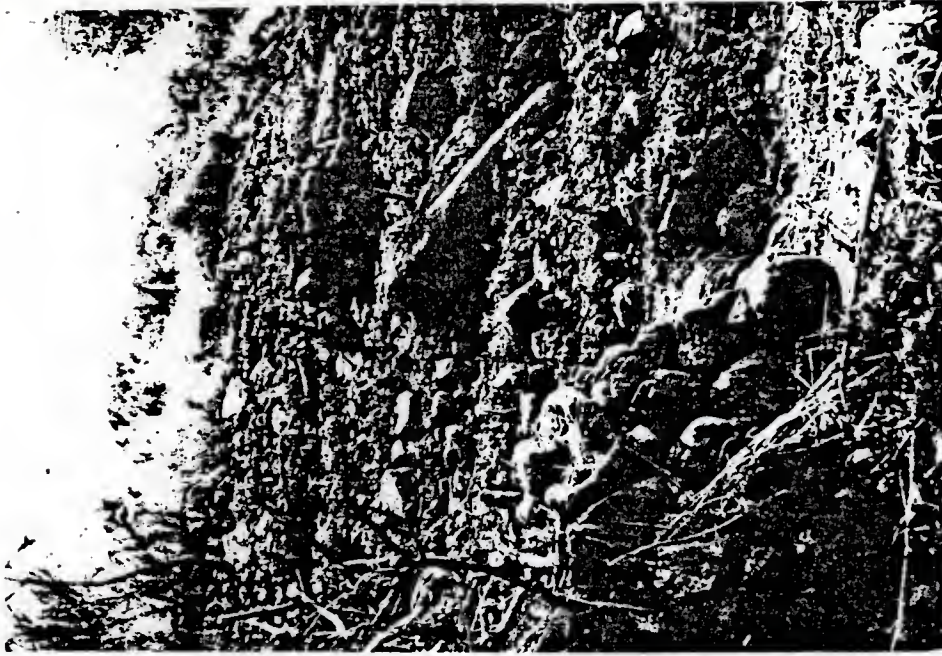


Figure 29: A Newly Sown Field. Rather than constructing terraces, the farmer of this plot has merely piled the rocks in mounds. The well-rounded surface material is typical of northeast Tortola, where diorite occurs.



Figure 28: Terraced Fields. Most remaining terraces are the product of long-past labor. This plot carries a healthy ground cover of sweet potatoes.



Figure 30: Red Poll Cattle. Hardy to heat and drought, this breed is utilized for both milk and meat production.

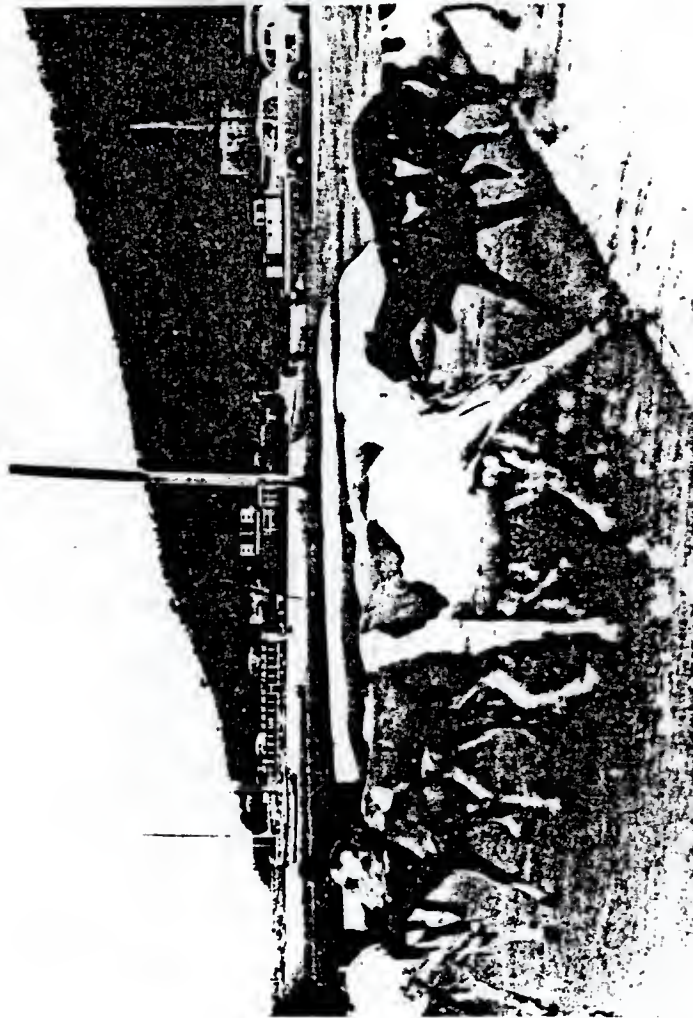


Figure 31: Small Livestock in Road Town. Despite legislation prohibiting the presence of livestock within the major urban area, wandering and untended flocks are a common sight.

Land Tenure

Tortola provides an interesting anomaly in the West Indies with regard to land tenure, since it is the small peasant landholding rather than the plantation estate that prevails. The usual type of tenure is freehold, with land having been acquired by outright purchase, inheritance under a will, or intestacy, since 1946, by inheritance in equal shares by all the children subject only to the interest of a surviving spouse (United Kingdom Colonial Office, 1959, p. 18).

Until the present decade, there was considerable insecurity of title and interminable property disputes, owing mainly to the fact that the principles of English land law were neither understood nor observed by those who became the new land owners after abandonment of the estates in the mid-19th century. Problems eventually were solved by the undertaking of a Cadastral and Land Registration Project, beginning in late 1971. After its completion in December, 1974, approximately 5,000 parcels of land had been registered, of which over 3,000 were located in Tortola (United Kingdom Foreign and Commonwealth Office, 1975, p. 5).

Because of the frequent occurrence of intestacy, it is quite uncommon, in fact, for the average Tortolian and his family not to own a few acres of land. Although he may not farm or utilize that land in any way, the Tortolian's attachment to his property is exceedingly strong; as Todman remarked:

. . . to [the average British Virgin Islander] land has become more than the basic means of production; it is a symbol of his independence and the key to that independence. He feels that it gives him the right to refuse to be pushed around by any man, whoever and wherever he may be. (1971, p. 28)

This attitude of independence was appropriately expressed by a Mr. Alton Smith, a farmer who works his land in the Carrot Bay area of Tortola:

Some of the land on the hill has been sold for development. But this bottom land, nobody could buy it. The Rockefellers

could get rid of all sorts of companies and still couldn't buy it. ("The agricultural revolution begins", 1974, p. 7)

Not surprisingly, in the face of such adversity, Laurence Rockefeller interests took the better part of three years to acquire but 56 acres for an hotel resort on Virgin Gorda. Each acre was owned by several people, and each owner insisted upon negotiating with the buyer directly (Kingsbury, 1960, p. 10). Since such a procedure would tend to dissuade many investors from developing an hotel or resort housing in certain areas of Tortola, land tenure was included as a parameter in the OASYS model (see Figure 32).⁵

The alienation of land through speculation by expatriates and foreign investors has been minimized by sensible and early legislation requiring that a non-Islander expend a certain financial amount to develop his property within a fixed period -- usually three to four years. Inevitably, however, with a growing tourism-oriented economy, land prices have sky-rocketed, with an acre of underdeveloped land often selling for \$7,000, and within a developed area for up to \$20,000. Such pecuniary rewards have induced certain Islanders to sell their property, and approximately 15 percent of Tortola's land area is now held by expatriates (United Nations' Physical Development Programme, 1976, p. II-4).⁶ Should condominium and resort residential development become more prevalent, this proportion will likely continue to increase in the future.

Demographic and Labor Force Characteristics

While saving the Territory from otherwise acute population pressures in the past, the continued emigration of British Virgin Islanders since the growth in tourism has resulted in the need for immigrant labor (primarily from the Commonwealth Caribbean) to fill the void in the

economy. As a consequence, the demographic profile of Tortola has changed markedly over the last few decades.

Out-migration

As mentioned briefly in previous sections, the 'push-pull' effect of a stagnant domestic economy and rapid growth of the tourist sector in the U.S. Virgin Islands created a large outflow of the working-age population. Augelli remarked:

. . . there is reason to believe that if all restrictions on movement to St. Thomas were eliminated, the local economy of the British Virgin Islands would be almost wiped out, and at least the youthful population of the islands would move wholesale to the United States territory. (1956, p. 54)

Between 1946 and 1950, a small net gain of 600 in the local population occurred; the natural increase (registered births minus registered deaths) during this period, however, was in the order of 3,100, denoting that four out of every five of the additional population left the Territory (Elkan and Morley, 1971, p. 6).

The initiation of a tourism industry within the Territory itself and the creation of jobs in the mid-1960's surprisingly did little to stem the outward flow or encourage Islanders to return.⁷ The reason largely was an inequity in wage levels: whereas the average per capita income in the U.S. Virgins was \$2,100 in 1965, even three years later the corresponding figure for the Territory was estimated to be only \$557 (Elkan and Morley, 1971, p. 14). In addition, a psychological motivation for continued outmigration was evident:

. . . it was generally believed by the inhabitants that they could best help their native land by leaving it. People acted on that belief; a whole way of life developed around this urge to migrate, and this has resulted in the very slow population growth within the past few years. . . . The events of 1970 and former years have not brought about any fundamental changes in attitudes or values. (United Kingdom Foreign and Commonwealth Office, 1973a, p. 6)

It appears doubtful whether this trend will be reversed in the very near future, at least as a result of the internal economic development of the Territory.

The only temporary halts in outmigration have, in fact, been caused by external action -- namely, the restriction of immigrants to, and the deportation of foreign workers from, the U.S. Virgin Islands. These periodic purges, however, apparently are conducted primarily for local political purposes rather than economic reasons (Norton, 1971, p. 295). The effects of deporting 7 percent of its population during a sweep in 1971 was soon noticed in the American territory. An article in the St. Thomas periodical, The Carib, mentioned "the alarming number of blue-collar and service workers lost. . . . The gap the departed workers leave is a significant one". Traditionally, immigrant workers have filled the more menial, lower-paid but essential jobs in industries which support the all-important tourism trade. Even before the peak tourist season in 1971, St. Thomian hotels such as the Hilton were beginning to experience an acute labor shortage:

Manager Bruce Dressler is down to his last eight dishwashers, and is gloomily contemplating the prospect of serving only buffet meals during next winter's season. (The St. Croix Avis, 1971, p. 3)

Since such locally generated programs of deportation are for political expediency, their duration has always been short-lived.

A sterner test for aspiring Tortolian emigrants was presented by a tightening of visa requirements imposed by the United States' Federal Government in 1974, which would have seriously limited the number of Islanders admitted to the American territory. On the occasion of the third annual B.V.I./U.S.V.I. Friendship Day -- established to commemorate

the close social and cultural relationships between the two territories -- the Chief Minister for the British Virgin Islands stated:

We were reminded only too recently how decisions taken in a remote national capital could, if implemented, drastically affect the relaxed official pattern of mutual dealings that we have struggled to build up over the years. Such decisions could disrupt the smooth flow of people and goods across the few feet of water which divide us, unless our special relationship is taken into account and appropriate allowances made.
(United Kingdom Foreign Commonwealth Office, 1975, p. 9)

A favored treatment for British Virgin Islanders was, in fact, eventually achieved when visa requirements were modified in October, 1975, to allow Islanders to enter the U.S. Virgins upon proof of residence in the British territory. Emigration has thus continued.

The close ties between the two groups of islands inevitably has raised recurring speculation concerning eventual political amalgamation. On the occasion of the fourth annual B.V.I./U.S.V.I. Friendship Day in October, 1975, the Governor of the United States' Virgins deemed it "not too far-fetched to anticipate the . . . unity of both groups of islands under one flag" (United Kingdom Foreign and Commonwealth Office, 1976, p. 9). Given the historical precedence, such a move probably would be as equally calamitous to the British Virgin Islands' fledgling economy as to that, say, of the Mexican economy if a similar agreement was made by that country with the continental United States.

Immigration

As a consequence of the counter-trends of the outflow of Islanders and the inflow of expatriates, while the number of resident British Virgin Islanders actually decreased from 7,380 to approximately 6,700 persons between 1960 and 1970, the number of expatriates increased from about 490 to 3,600 persons over the same period (Population Census of the Commonwealth Caribbean, 1964; 1976).

Accordingly, the characteristics of the labor force changed radically within a few short years. Elkan and Morley (1971, p. 30) estimated that of the Territory's total labor of 3,810 in 1970, some 1,736 persons (46 percent) had been born in countries other than the British Virgin Islands. Confronted with such a large inflow, the Government imposed immigration restrictions in 1969, making work permits harder to obtain as well as closing certain employment categories altogether to outside laborers.

The recession after 1970 severely reduced the number of new job opportunities. Lay-offs were particularly heavy in the construction sector which had relied greatly upon an expatriate labor force. Because of the shortage of jobs, approximately 800 immigrant workers and dependents were forced to leave the Territory. As shown in Table 9, the expatriate labor force dropped significantly from 1,630 persons in 1970 to 960 by 1972, and it was not until 1974 that a recovery in the economy prompted renewed immigration.

By 1975, however, the Government had become conscious of the ill-effects of uncontrolled immigration, and reviewed its policy concerning the granting of work permits, "belonger" status and residency requirements. It had become apparent that foreigners were controlling the majority of professional jobs (current estimates range from between 60 and 80 percent of all such positions), and thus the Government embarked upon encouraging training in tourism and management occupations to enable nationals eventually to replace skilled expatriates. Also, by 1976, some 7 percent of the total labor force comprised immigrants who had been granted "belonger" status and had become British Virgin Island nationals (Lettsome, 1977a, p. 5). Thus, in that year, although Table 9 depicts

Table 9: Estimated Registered Employees by Nationality, 1970, 1976.

	<u>Nationality</u>		<u>Total</u>	<u>Percent of Other to Total</u>
	<u>British Virgin Islands</u>	<u>Other</u>		
1970	1,660	1,630	3,290	49.5
1971	1,410	1,130	2,540	44.5
1972	1,480	960	2,440	39.3
1973	1,620	880	2,500	35.2
1974	1,790	980	2,770	35.4
1975	1,850	920	2,770	33.2
1976	1,950	940	2,890	32.5

Source: Lettsome, 1977a, p. 45.

Note: The total labor force in the British Virgins has been larger than the above figures suggest, since the latter include only those workers registered with the Government. As an example, the total labor force in 1975 was estimated to be 3,270 persons (British Virgin Islands, 1975, 1976, p. 16).



Figure 33: 'Downislanders' Sending Remittances Home. Although living expenses in Tortola are high, several of the West Indian expatriates manage to provide for their off-island families.



Figure 34: Queen's Birthday Parade. The Governor salutes the local constabulary, as Girl Guides and Boy Scouts await their turn.

that 67 percent of the labor force were classified as British Virgin Islanders, only 60 percent were actually born within the Territory.

The success of the Government's stated policy to gradually replace skilled expatriates by local people depends primarily upon two factors. First, vocational training would need to be expanded greatly; secondly, having been given the necessary skills, British Virgin Islanders would need to be enticed to stay within the Territory rather than migrate. The latter task could prove harder for the Government to achieve than the first.

The Tourist Population

Within the last ten years, the number of tourists visiting the Territory has increased fourfold -- from 17,500 in 1967 to approximately 70,300 in 1976 (Lettsome, 1977b, p. 9). Absolute figures are of little value, however, without reference to the relative size of the indigenous population and land area of the host country. Since the British Virgin Islands have both a small area and population, the number of tourists presently visiting the Territory can only be considered substantial.

Even in 1965, when visitors totalled about 12,000, the British Virgins were rated second highest in the Commonwealth Caribbean in terms of tourist arrivals per thousand population (1,283), and third highest with regard to tourist arrivals per square mile of land area (203; Bryden, 1973, p. 93).⁸ Assuming that the Territory's resident population in 1976 was approximately 10,500 (United Nations' Physical Development Programme, 1976, p. 9), the corresponding ratios for that year were 6,695 and 1,191, respectively.⁹ The average daily number of tourists within the Territory was about 1,500 persons, which -- in relation to the size of the resident population -- must be viewed as a significant demographic component of the Islands.

Environmental Considerations

The transformation from an agricultural to a tourism-oriented society has resulted in an altered utilization of the environment. Whereas previous agricultural pursuits imposed demands upon the soils and vegetation of the interior upland, most tourist activities are concentrated within the littoral zone. Thus, while denuded slopes and depleted soils are being allowed to return to a healthier state, the shoreline has been subject to increased use, modification and occasional abuse. Selected activities and their ramifications upon Tortola's coastal areas are discussed briefly below.

Construction

A new and thriving tourism industry is particularly demanding upon the construction sector. Not only is an upgrading of the engineering infrastructure (such as roads, airports, and public utilities) usually called for, but also visitor accommodations and supportive retail and commercial establishments have to be provided. In a small, very mountainous island such as Tortola, a major problem is the scarcity of suitable building sites. One obvious solution is the creation of landfills, generally and inappropriately termed "reclamation" schemes. The largest in Tortola is Wickhams Cay, although several other smaller developments have been undertaken in Road Bay and along the southern coastline.

Most of the landfill material is usually derived by offshore dredging activities; in the instance of Wickhams Cay, for example, a total of 800,000 cubic yards (612,000 m³) was dredged from Road Bay. While careful dredging operations may cause little damage to the marine environment, extensive harm can occur as a result of immoderate action. Even some distance away from the dredging site, reef communities may be destroyed by a consequent reduction in photosynthesis, caused by the

suspension of disturbed sand particles and by the physical smothering of reefs. It is quite possible that the impoverished areas of marine flora and fauna to the southwest of Road Bay were created by the dredging operations for Wickhams Cay (Richards and Dumbleton, 1972, p. F10).

Another disturbing result of landfill operations in Road Bay has been the almost complete removal of a once extensive mangrove area, and with it a sizeable bird nesting and fish breeding nursery area. The recently declining fish yields experienced by local fishermen may at least be partially explained by the mangrove's destruction.

The removal of beach sand (or "propping") for the purpose of local residential construction has been a common and traditional practice in Tortola. With the introduction of tourism, however, a conflict of interest has arisen, for not only are the most accessible and well-endowed beaches the most suitable for sand removal, but they also are the major venues for tourist activities. Even those beaches which presently are sufficiently inaccessible to deter most tourists -- for example, Brewers Bay and Josias Bay on the northern coast of Tortola -- have deteriorated significantly because of local construction demands. Thus the present actions of the island's population may be restricting the viability of future tourism expansion. The act of "propping" serves as one fairly explicit example of a traditional practice that may be forced to succumb to the needs and priorities of a metamorphosed economy.

Although not directly related to the actual construction of hotels and resort housing, the stripping and sale of topsoil has become more prevalent as the horticultural needs of tourist facilities have increased. This practice not only destroys the protective natural vegetation, but would also appear to contravene the Government's stated policy of encouraging agriculture.

Disposal of Waste

The problem of sewage disposal has been referred to in a previous section. While not perhaps posing the same health risks to the population, the careless disposal of litter has reduced the aesthetic quality of certain beach areas, in the opinion of many visitors. Not only are the vegetated areas behind the beaches the common dumping ground of discarded cans, bottles and paper, but each new high tide brings with it the evidence of a few yachtsmen's indifference.

To their credit, the yacht charter concerns have responded strongly to any littering by their clients. They enforce their own anti-litter regulations, are keen to report instances of irresponsible waste disposal and, on a few occasions, have been known even to fine those clients who have dumped garbage (Howell and Towle, 1976, n.p.). As resident and visitor populations increase, however, together with the importation of paper products and other single-use commodities, littering likely will continue to be a major aggravation to both tourists and Tortolians.

Wildlife and Historic Legacy

Although limited in extent and diversity in comparison to some of the larger Caribbean islands, Tortola does possess some interesting flora and fauna and attractive, but dilapidated, historic ruins. Some of the rarer fauna that visit the island's shores are the green and hawksbill turtles, both listed in the 1974 Red Data Book of endangered wildlife species of the International Union for Conservation of Nature and Natural Resources (IUCN). Long hunted by local fishermen, the hawksbill in particular has come under renewed demand for its carapace, which is utilized to manufacture ornaments and jewelry for sale to tourists.¹⁰ To the author's knowledge, such ornaments were sold in at least two Tortolian establishments during 1976. Although the Endangered Species

Act of the United States prohibits the importation of hawksbill products into the country, few American visitors apparently are aware that their purchase is actually illegal.

According to the British Virgin Island's Hotel and Tourist Association, some of the Territory's reefs purportedly have suffered from excessive spear fishing and coral collecting, such as on Peter Island and in the Little Dix Bay area. A determined stand taken by the Association has been successful in dissuading many local shops from selling spearguns. Although damage to the reefs of Tortola does not appear extensive or serious as yet, the continuation of such activities by a growing number of visitors could adversely affect an important tourist attraction of the island.

Several picturesque historic ruins still dot Tortola's landscape, providing poignant reminders of the island's past history. Many of these, however, have fallen to the ravages and despoilation of tourism development. An old fort on the outskirts of Road Town, for example, was almost completely obliterated by the construction of an hotel ("Fort Burt") on top of its foundations. Another unfortunate example is the fairly extensive and sound ruin near Long Bay Hotel in western Tortola, which has been added on to with raw concrete blocks. It is probable that other ruins will eventually succumb to a similar fate.¹¹

It is unfortunate in certain regards that the tourism industry is largely reliant for its prosperity upon the offering of unique and exotic titillations to its guests. Within a small Caribbean island such as Tortola, the pristine beaches and reefs, the "quaint" lifestyle of the inhabitants, the bygone days of piratical pursuits and unusual fauna and flora are all singled out and proffered in a commercial package for the mass consumption by visitors. Thus, some of the more fragile aspects of

an island are subject to the greatest stress, resulting in their inevitable deterioration and potential demise.

Summary

Aptly termed 'the great equalizer', tourism has imposed upon the island an exogenously oriented society which -- although to the obvious economic benefit of Tortola -- has not been wholly empathetic with the existing environment and its past utilization. The extent to which both visitors and residents would desire further change and development -- as determined by the author's field survey and research results -- is the basis for discussion in the following chapters.

Notes

1. In 1976, for example, approximately 60,000 passengers either departed from, or arrived at, Beef Island International Airport (Lettsome, 1977b).
2. The problem of accessibility to the Territory is further hindered by the inability of Beef Island International Airport to cater to night flights at present. Thus, unless visitors are prepared to pay for overnight accommodations in Antigua, St. Thomas or Puerto Rico, they will opt for the busier day-time flights from the United States or Europe.
3. During the construction of Wickhams Cay, for example, a total of 800,000 cubic yards of coral sand was dredged from Road Bay (Howell and Towle, 1976, n.p.).
4. One recent and interesting development has been a private commercial experiment in hydroponics. Located in Road Town and begun in early 1976, the operation produces lettuce, tomatoes, cucumbers, egg plant, squash and various other short-term crops. Hydroponics is relatively capital intensive, however, and it is doubtful whether sufficient demand would allow a sizeable labor force to be employed in this activity.
5. A comparison by the reader of Figures 15 and 32 will indicate the amount of detail that was lost in transposing a normal graphic representation into data format suitable for inclusion in the OASYS computer model. Since land tenure was by far the most complex parameter utilized, as far as fragmentation of data was concerned,

the loss of detail was not as great with regard to other parameters.

6. The proportion of expatriate-owned land in the Territory as a whole is far higher, however -- approximately 24 percent (United Nations' Physical Development Programme, 1976, p. 114).
7. Between 1960 and 1970, it has been estimated that approximately 3,000 British Virgin Island nationals left the Territory, and a further 700 emigrated between 1970 and 1975 (United Nations' Physical Development Programme, 1976, pp. II.10-11).
8. The highest of the ten Commonwealth Caribbean countries with regard to tourist arrivals per thousand population was the Bahamas, with a figure of 3,691. For the sake of international comparison, the corresponding figures for Hong Kong, Spain and Switzerland -- all countries with a highly developed tourism industry -- were 110, 391 and 970, respectively. Caribbean islands with a higher figure than the Territory for tourist arrivals per square mile of land area were Barbados (412) and Antigua (285), although Montserrat was co-equal with 203 (Bryden, 1973, p. 93).
9. With regard to tourist arrivals per square mile of land area, it is interesting to note that the 1976 figure for the British Virgin Islands was higher than the corresponding figure for Hong Kong in 1965 (1,019; Bryden, 1973, p. 93).
10. It is unfortunate that the Handicrafts Center, which was funded by the United Nations Development Programme, taught local aspiring artisans to manufacture ornaments from hawksbill carapaces ("Jewels from earth and sea", 1974, p. 33).
11. Some measures aimed at the preservation of ruins have actually been deleterious rather than beneficial in effect. Expansion of the mortar used in filling up the cracks of the Fort Recovery gun tower (a well preserved ruin on the southern shoreline) is causing severe structural stress.

CHAPTER V SURVEY DESIGN AND RESEARCH RESULTS

Survey Design

The lack of recent or detailed data for the island of Tortola at the time of the survey period unfortunately prevented any in-depth stratification and sample design. The necessary detailed information concerning demographic and economic characteristics for the resident population obtained by the 1970 Census was not available until several months after the survey was initiated. After consulting the British Virgin Islands' Statistics Office, the author also rejected the 1960 Census as a data source as being largely irrelevant to Tortola in the mid-1970's.

The author was also faced with a scarcity of information concerning the tourist population. The only statistics that had been compiled over any substantial period of time (from 1967 onwards) addressed the number of visitor arrivals to the Territory on a monthly basis. The year 1973 had marked the initiation of an ongoing attempt to gain more comprehensive visitor information (including age, sex and place of residence) through the use of embarkation cards; however, because of the short-term and preliminary nature of these findings, and since they were available only after the public survey questionnaire had been structured and initial forms distributed, they were not utilized in the survey design.¹ One other Government survey ran in partial concurrence (February to August, 1975) with the author's own, but only addressed tourist expenditures (Evans, 1975a).

A random sample from each stratum, or culture group, was taken, therefore, for use in a proportional analysis. The public survey was undertaken during the period July, 1974, to June, 1975, with questionnaires being left at chosen distribution points and collected at least biweekly.² Since the samples necessarily were non-stratified, the distribution points were selected with the greatest care so as to help prevent undue skewness in the samples for each of the four culture groups (the Tortolian population,³ "downislanders" from elsewhere in the Caribbean, continental residents, and lastly, tourists). Such establishments as hotels and guest-houses, restaurants and bars (both visitor and locally oriented), shops and marinas, public buildings such as the library, hospital and high school, government offices and departments, a doctor's office, civic and sports clubs and private businesses -- in all a total of 34 distribution points -- were eventually chosen, thus providing a broad cross-section for polling. (A full listing of the establishments is given in Appendix I, and the public survey questionnaire utilized is presented in Appendix II.)

Some spatial bias might have arisen inadvertently in favor of the major settlement of Road Town as compared with remoter rural areas, owing to the author's lack of ready transportation outside of the Road Town area. Since the latter serves, however, as the major hub of both social and employment activities for the island, it was hoped that these outlying areas would be adequately represented by the daily flow of residents from these areas into the capital.

The three experts' surveys (from which the Alpha-and Beta-values were to be derived) were undertaken toward the latter part of the research period (March to June, 1975) so as to allow the author sufficient time to make a reasonable decision in allocating these questionnaires. A

list of the respondents for each survey appears Appendix III, and the expert survey questionnaires are presented in Appendices IV, V and VI.

Survey Returns

During the twelve-month period, approximately 4,200 public survey questionnaires were distributed in Tortola. Most disappeared quickly, apparently becoming souvenirs of dubious value. At the end of the period, a total of 728 completed forms had been collected, representing a return rate of 17 percent. Considering the relative complexity of the questionnaire, it was anticipated that the return rate would be fairly low.

The number of responses according to culture group is given in Table 10, together with an estimate of the sizes of each target population. Potential respondents were considered to be any persons over the age of fourteen, since it was thought highly unlikely that any younger person would be able to complete the difficult questionnaire.

With regard to the Tortolian group, it was assumed for lack of better information that the population had increased during the 1970's at an annual rate equal to that which occurred between 1960 and 1970. By the beginning of 1975, the total target population of the survey was estimated to be in the vicinity of 3,200 persons. A 5 percent sample was set as a minimal goal, and an 8 percent poll was actually achieved.

The sample return for the West Indian immigrant group totalled 23, and was dismissed as being too small a sample to be valid. In 1970, for example, it was estimated by the Census of Population that approximately 3,500 immigrants were in the Territory at that time, the large majority of whom were West Indian; this population has not decreased sufficiently since then to warrant analysis of the return.

Table 10: Target Populations and Sample Returns,
General Public Survey, July 1974 - June 1975

<u>Culture Group</u>	<u>Estimated Target^{1/} Population</u>	<u>Completed Response</u>	
		<u>Number</u>	<u>% of Total</u>
Tortolians	3,200	248	7.8
High School subgroup	350	65	18.5
West Indian immigrants	1,400	23	1.6
Continental residents	400	56	14.0
Tourists	60,500	424	0.7

^{1/} Population estimates were based upon preliminary findings of the 1970 Census of Population and the author's own estimates for the resident groupings. Tourist figures were supplied by the Statistics Office, British Virgin Islands (Lettsome, 1977b). Target populations except for tourists include only those persons 15 years or older.

Instead, a survey of the high school students was conducted to help determine if perceptions toward the environment altered greatly according to age group in addition to culture group. With the cooperation of the high school principal, a total of 65 questionnaires were completed by graduating students; this figure approximated 19 percent of the estimated number of persons within the fifteen to sixteen year age group in Tortola. In addition to being analyzed as a sub-group return, these questionnaires were also included within the larger Tortolian sample on a proportional basis in determining the Gamma-values for the belonger culture group as a whole.⁴

With regard to the continental resident group, Shankland Cox and Associates (1972) inferred from the results of a limited sample that 37 percent of the 400 families then registered with the immigrant authorities were of European or North American origin, representing approximately 300 individuals. Of these, it was further estimated that 85 percent, or about 250 persons, were sixteen years or older. Since the report was written during the local recession years of 1971-72, the latter figure was revised upwards to 400 for use in the 1974-75 survey in order to reflect improved business conditions and an expanding economy, as well as to include persons aged fifteen. A minimal sample of 10 percent was aimed for, and one of 14 percent (56 completed questionnaires) was achieved.

Again, as a guideline, the total tourist population visiting the Territory during the survey period was projected to fall between 50,000 and 60,000 persons, and a minimal goal of 0.5 percent sample size was set. The actual number of tourists was slightly higher than anticipated, numbering 60,514 (Evans, 1975d; 1976c), but the final sample size for

this group totalled 424 returns, representing 0.7 percent of the population.⁵

The seasonal distribution of total tourist arrivals to the Territory and visitor sample returns are shown in Table 11. Although the two sets of figures correspond fairly closely, some minor discrepancies occur. In analyzing all of the visitors polled as a single culture group, therefore, their returns were weighted according to the distribution of total tourist arrivals.

Public Survey Results

As hypothesized, the perceptions of each culture group -- and, perhaps more surprisingly, each subgroup -- differed markedly in several ways. The believer sample tended to favor the most development (especially the high school sub-group), whereas the visitor respondents generally desired little or no further development. The continental residents usually took a stand between these extremes. Responses by the various group samples according to survey question are given below.

Type of Tourist Accommodation Desired

The respondent was given the choice of four types of tourist accommodation for development in Tortola. The first was described as a large hotel, with 100 or more beds, and offering a swimming pool, outdoor bar, golf course, beach location, night shows, and with American-style food and living accommodations. The second type of accommodation was described as a medium-sized hotel, having about 20 to 50 beds and a swimming pool, located near a beach, and serving mostly American-style food. The third option was a small hotel or guesthouse, with about five to 15 beds, offering local foods as a specialty of the house. Lastly, the development of visitor-owned apartments, or condominiums, was

Table 11: Target Populations and Sample Returns for
Tourists by Season, July 1974 - June 1975

<u>Period</u>	<u>Estimated Population</u>		<u>Completed Responses</u>	
	<u>Number</u>	<u>% of Total</u>	<u>Number</u>	<u>% of Total</u>
July-August	10,731	18	76	18
September-November	8,405	14	64	15
December-March	26,493	44	195	46
April-June	<u>14,885</u>	<u>24</u>	<u>89</u>	<u>21</u>
TOTAL	60,514	100	424	100

Source: Evans, 1975d; 1976c.
Public survey questionnaire, July, 1974 - June, 1975.

proffered for consideration. With the exception of the last option, the questionnaire description of each type of accommodation was accompanied by a sketch based upon actual examples taken from Caribbean islands.

The different responses of each group sample are depicted in Table 12. A clear majority (64 percent) of the high school respondents favored the large hotel option. An informal survey conducted among a few of the respondents suggested that reasons for this choice included an awareness of associated job openings (such as waiters, barmen and taxi-drivers), a place for night spot entertainment, and a desire to emulate development in the U.S. Virgin Islands, and in particular St. Thomas.

The Tortolian sample group as a whole, reflecting perhaps the pragmatism of older age, showed itself to be more evenly divided about their first preferences. In contrast to the high school sub-sample, only 21 percent gave their first preference to the development of large hotels and even then somewhat begrudgingly: as one respondent commented, "Tortola must cater to the wishes of the majority of its tourists." The medium-sized hotel option received the most first choice preferences (46 percent), followed by small, locally owned hotels and guest-houses (33 percent). One respondent suggested a mixture of hotel types, comprising 70 percent of large hotels and condominiums -- with the proviso, however, that they be "confined to carefully researched and controlled locations."

Both the continental resident and visitor respondents gave a very low first choice preference to large hotels (.7 percent and 8 percent, respectively). Several respondents in both samples were vehemently against such development, judging by their written remarks, referring to the overdevelopment -- in their opinion -- of Puerto Rico and the U.S. Virgin Islands.

Table 12: Tourist Accommodation: First Choice Preference
by All Sample Groups

<u>Sample Group</u>	(Percent)			
	<u>Large Hotel</u>	<u>Medium Hotel</u>	<u>Small Hotel or Guest-houses</u>	<u>Visitor Apts.</u>
Tortolians	21	46	33	*
High School	64	18	16	2
Continental				
Residents	7	53	40	*
Visitors	8	26	62	4

* signifies less than 0.5 percent

Source: Public survey questionnaire, July 1974 - June 1975.

The continental residents and visitors did differ significantly, however, over their choice between the development of medium-sized and small hotels and guest-houses. A majority of the former group (53 percent) favored the medium-sized hotel, providing that it served local and continental dishes, while 62 percent of the tourist sample favored the small, locally owned guest-house, with written emphasis being placed on local ownership. The proviso was made a few times, however, that a small guest-house would prove not large enough to be efficient and, whether locally owned or not, would have to provide the usual hotel amenities.

It should be noted that discrepancies did occur within the tourist group, depending upon the time of survey. The wealthier visitors of the winter season (December to March) voted heavily for the small guest-house option (70 percent), as compared to only 47 percent of tourists polled between September and November. Despite these internal inconsistencies, a large overall majority still gave first choice preference to the development of small, local establishments. Their desire was unlikely to be fulfilled however -- at least, according to the survey -- in view of the rather negative response given to this development alternative by the Tortolian sample group.

All groups of respondents were united in their opposition to the development of visitor-owned apartments, or condominiums. Those tourists polled during December to March were most in favor, possibly because they as a group were most likely to be able to afford such apartments, but even so, only 6 percent gave first choice preference to this type of development. Moreover, one of the latter respondents stipulated that the apartments "should be rentable to ensure local people have continued income, or taxed if not rented."

Inclusion for analysis of all other rated preferences allows some greater insight into the respondents' opinions concerning the development of tourist accommodation. The divided opinion of the Tortolian sample for example, is further evidenced in Table 13, with just as many respondents placing large hotels in first as in last position, and with the preference for small hotels evenly distributed over the first three rankings. The firm position of condominiums is the least preferred choice is also clearly seen, as well as the overall preference for medium-sized hotels.

The high school responses, depicted in Table 14, suggest a relationship between popularity and size -- the larger the development, the more it is preferred. In contrast, Tables 15 and 16 portray the deep distaste with which large hotels are viewed by both expatriates and visitors, who gave 62 percent and 69 percent, respectively, of their last choice preferences to this type of development. As one American visitor remarked, "We came here to leave those things!"

Future Number of Tourists Desired

Respondents were asked to judge which was most preferable: to have "far more" tourists in the future, "more" tourists, "about the same as now," "fewer" tourists, or lastly, "far fewer" tourists. Findings for the group samples generally were consistent with those concerning tourist accommodation; for example, as shown in Table 17, the sample groups which desired the most development -- the Tortolian group and high school subgroup -- also desired the most tourists, with over 90 percent of all preferences being placed in the upper two brackets.

The largest proportion of the continental residents or expatriates, on the other hand, desired merely "more" tourists (47 percent), while the

Table 13: Preferred Tourist Accommodation: Tortolian Sample

<u>Type of Accommodation</u>	<u>(Percent for Each Ranking)</u>			
	<u>First</u>	<u>Second</u>	<u>Third</u>	<u>Fourth</u>
Large Hotel	21	16	41	22
Medium-sized Hotel	46	49	4	1
Small Hotel or Guest-house	33	34	28	5
Visitor-owned Apartments (condominiums)	0	1	27	72

Source: Public survey questionnaire, July 1974 - June 1975.

Table 14: Preferred Tourist Accommodation: High School Sub-Sample

<u>Type of Accommodation</u>	<u>(Percent for Each Ranking)</u>			
	<u>First</u>	<u>Second</u>	<u>Third</u>	<u>Fourth</u>
Large Hotel	64	19	7	10
Medium-sized Hotel	18	49	27	6
Small Hotel or Guest-house	16	23	46	15
Visitor-owned Apartments (condominiums)	2	9	20	69

Source: Public survey questionnaire, July 1974 - June 1975.

Table 15: Preferred Tourist Accommodation: Continental Resident Sample

<u>Type of Accommodation</u>	<u>(Percent for Each Ranking)</u>			
	<u>First</u>	<u>Second</u>	<u>Third</u>	<u>Fourth</u>
Large Hotel	7	5	26	62
Medium-sized Hotel	53	33	11	3
Small Hotel or Guest-house	40	43	10	7
Visitor-owned Apartments (condominiums)	*	19	53	28

* denotes less than 0.5 percent.

Source: Public survey questionnaire, July 1974 - June 1975.

Table 16: Preferred Tourist Accommodation: Visitor Sample

<u>Type of Accommodation</u>	<u>(Percent for Each Ranking)</u>			
	<u>First</u>	<u>Second</u>	<u>Third</u>	<u>Fourth</u>
Large Hotel	8	5	18	69
Medium-sized Hotel	26	45	29	*
Small Hotel or Guest-house	62	27	8	3
Visitor-owned Apartments (condominiums)	4	23	45	28

* denotes less than 0.5 percent.

Source: Public survey questionnaire, July 1974 - June 1975.

Table 17: Preferred Future Number of Tourists: All Sample Groups

<u>Sample Group</u>	<u>Percent</u>			
	<u>Far more Tourists</u>	<u>More Tourists</u>	<u>About the Same</u>	<u>Fewer Tourists</u>
Tortolians	60	35	4	*
High School	64	28	3	2
Continental Residents	14	47	23	16
Visitors	10	22	63	4
				1
				*
				2
				1
				1

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* denotes less than 0.5 percent of responses.

Source: Public survey questionnaire, July 1974 - June 1975.

next largest percentage desired "about the same" number in the future (23 percent). Interestingly enough, considering that the livelihoods of many of this group are dependent upon visitor expenditures, a higher proportion voted for "fewer" tourists (16 percent) than "far more" tourists (14 percent). This would tend to suggest that many of the respondents were attracted to Tortola because of its way of life, rather than for economic gain. In addition, many of the continental expatriates expressed their belief that the island simply could not handle mass tourism. If there were to be more visitors, they should not be living on the island, but "sailing away from it" -- a reference to the flourishing charter boat industry located in Tortola.

The visitors once again proved to be the most conservative respondents, with a large majority (63 percent) desiring no change in the number of tourists in the future. Inconsistencies were again noted, however, according to the seasonality of the responses; for example, whereas less than 0.5 percent of the visitors during the months April to June desired "far more" tourists, 27 percent of those visitors during the summer months of July and August did so. This may be partially explained by a greater overflow of visitors from the United States Virgin Islands during this time, many of whom make a one-day excursion to the Territory.

Importance of Factors in Attracting Tourists

Respondents were asked to rank a list of factors in order of importance in attracting tourists. The factors included Tortola's natural beauty, its climate, its friendly atmosphere, cultural and social interests, and its offering of sports activities.

As shown in Table 18, the Tortolian sample was relatively evenly divided between the island's natural beauty and its climate, with the category "friendly atmosphere" coming a close third. The high school

Table 18: Importance of Selected Factors in Attracting Tourists to Tortola;
First Choice Preferences by Culture Group

<u>Sample Group</u>	<u>Natural Beauty</u>	<u>Climate</u>	<u>Friendly Atmosphere</u>	<u>Cultural and Social Interests</u>	<u>Sports</u>	<u>Other</u>
Tortolians	38	30	21	3	10	*
High School	68	11	11	7	3	*
Continental Residents	35	23	12	2	28	*
Visitors	38	26	24	0	12	*

* denotes less than 0.5 percent of the respondent group.

Source: Public survey questionnaire, July 1974 - June 1975.

sub-sample was less ambivalent: 68 percent of this group thought that tourists primarily came to Tortola because of its beauty, with the next most important factors being climate and friendly atmosphere (both receiving 11 percent of first-choice preferences).

The continental residents were the only sample which voted heavily for sports as an attracting factor (28 percent), reflecting their own interests in sailing, swimming and other outdoor activities. Visitor respondents, on the other hand, considered this factor to be far less important than the island's beauty, climate and friendly atmosphere. This group sample gave a higher proportion of its first-choice preferences (24 percent) to the latter factor than any other group. It may also be noted in Table 18 that the Tortolian group reflected fairly accurately the responses of the visitors themselves -- more so than the expatriate sample.

As always, within the total visitor group, however, responses varied greatly according to the time of year. During the fine weather of April to June, 1975, the largest proportion of respondents voted for the factor of climate (36 percent). During the months of September to November, 1974, however, which were particularly rainy, the same factor received only 24 percent, but the island's friendly atmosphere received 47 percent -- the largest proportion. It is comforting to note that these visitors at least found some source of warmth during their stay.

A seeming inverse relationship existed between visitors' rating of Tortola's friendly atmosphere and the number of tourists present at the time. In contrast to the results above for the months September to November (representing the slackest visitor period of the year), only 13 percent of the visitors polled during the peak months of December to March (when two to three times as many tourists were present) chose

"friendly atmosphere" as first preference. This relationship may well be coincidental, and the voting may well have been swayed by the existing weather at the time, but it does suggest an avenue for further research.

The high school sub-sample and the continental expatriates were the most vocal in expressing other reasons why tourists came to Tortola. The former group emphasized West Indian music and food; whereas the expatriate sample's comments were centered around the theme of personal attention and individuality -- the island was not merely "an Americanized suburb like St. Thomas;" it had "no racial strife," and there was "no faceless bureaucracy." The few comments by tourists echoed these themes: there were "no credit cards," and the island was "quaint," with a "peaceful atmosphere." (A full listing of all comments made on the public questionnaires appears in Appendix VII.)

Perceptions Toward Aesthetics

Within the public survey questionnaire, a sketch-map of Tortola was provided, and respondents were invited to demarcate on this map those areas they found either "especially beautiful" or "ugly" (see Appendix II). Once completed, these maps were used to construct a composite, spatial, aesthetics matrix with rankings of 1 to 9. The rankings were then utilized as parameter types for each culture group sample, and were included in the OASYS model.

Areas considered most beautiful by the group samples generally were associated with the island's beaches, especially those located on the northwestern coastline. The larger urban areas of Road Town and East End/Long Look generally were viewed with either slight aesthetic disdain or neutrality. Other areas -- especially Beef Island, the site of an airport as well as belonger beach picnics -- received differing aesthetic ratings according to each culture group sample.

Amongst them, the four aesthetic maps ran the whole gamut of the aesthetic scale. Cane Garden Bay, located on the northwest shoreline and embodying most of a traveller's dreams, received the highest possible score of '9;' this is a spectacularly beautiful area with precipitous, though partially cultivated, hillsides, a small, picturesque coastal village of red roofs and fringing palms, and blessed with white, coral sands and offshore reefs. Less fortunately endowed and utilized, Duffs Bottom refuse dump, with its piles of moulding metal located immediately adjacent to the Territory's major highway, was treated with aesthetic scorn.

The composite aesthetics map for the Tortolian respondents reflected the overall, favorable opinion towards the northwestern coastline, and several beach areas (Belmont, Lower Belmont, Brewers Bay and Cane Garden Bay) received high ratings (see Figure 37). In addition, Beef Island -- more commonly used by belongers and 'downislanders' than tourists -- received consistently favorable scores, especially the locally popular beaches of Long Bay and Trellis Bay.

Only one inland location received a rating of higher than '6,' however, and corresponded to the general area of Mount Sage, most of which has been designated as a National Park. As discussed in greater depth in Chapter II, Mount Sage harbors the only remnants of a once extensive xerophytic rain forest, which today purportedly has no counterpart in the Caribbean. From the mountain's peak there are breath-taking views of the western coastline of Tortola, as well as neighboring St. John and St. Thomas on the horizon.

Low ratings of '4' and '5' were given to the two major urban areas. A few smaller communities (such as Sea Cow Bay) were rated even less charitably, with scores of '2,' '3' and '4.' Such ratings were far from



Figure 35: Cane Garden Bay. Located on the less developed northern coast, the area was rated highly with respect to both visual quality and development potential.



Figure 36: Duffs Bottom Refuse Dump. Tortola's only sanctioned disposal area was generally rated as possessing the lowest aesthetic quality.

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abundant, however, and it was obvious from the responses that Tortolians were proud of the natural beauty of their island. The most frequent comments made by this sample were "all over beautiful," and "no parts ugly." One respondent called for increased public participation: "We the people should get together and unite so it could be more beautiful and in order."

As may be seen in Figure 38, the high school sub-sample was slightly less enthusiastic in its praise of Tortola's beauty, with the highest score given being a '7.' As with the larger Tortolian sample, most of Beef Island received comparatively high ratings, together with the northwestern beaches.

Differences of opinion, however, arose over the aesthetic rating of Road Town. Consistent with the high school respondents' desire for further development, the newly reclaimed area of Wickhams Cay and the adjacent area of Main Street received a slightly favorable score of '6.' Other urban areas received essentially negative ratings. The only anomaly apparent to the author was the low aesthetic rating given to an undeveloped but accessible beach on the northern coastline (Josias Bay), especially since this area was given a favorable score by all other sample groups.

Almost all of the favorable ratings given by the continental resident group were limited to the northern half of the Tortola, comprising both developed and undeveloped beach areas, as well as the Ridge Road area, which basically follows the watershed of the island (see Figure 39). Several of the expatriates have their homes in this latter upland area (especially around Greenbanks and Great Mountain above Road Town), and thus would tend to be partial to these areas. Similarly, since few

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Figure 38: Parameter Aesthetics: High School Students

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used the beaches of Beef Island, most gave these areas only neutral or marginally favorable ratings.

The continental residents were slightly harsher in their judgment than the Tortolian group and sub-group on the aesthetic quality of urban areas, giving both Road Town and East End/Long Look negative ratings of '3' and '4.' Certain of the newer architectural styles elsewhere also were commented upon adversely, as being "messy" or because they did "not blend in with the coastline."

The aesthetic ratings of the visitors had to be viewed slightly differently than those of the other sample groups, where it was assumed that respondents were well acquainted with the island. With the visitor sample, however, it had to be assumed that a rating of '5' could imply ignorance of the area as well as just neutral aesthetic feelings. The visitors' sketchmap is thus as much a map of knowledgeability as it is one of aesthetic sensibilities.

Although parsimonious with their comments, the visitors were lavish with their ratings, particularly for the northwest coastline and beaches which consistently scored '7' and above. One general pattern emerges from Figure 40 -- almost all of the area to the west of Road Town received a positive rating as compared to the essentially neutral rating to the east. This could well suggest that visitors confine their travels to the western half of the island.⁶ Again, almost the whole of Beef Island received neutral ratings, suggesting that even though many visitors entered the Territory at this point, few returned for leisure activities.

The varying scores given to the Road Town area indicate that many of the visitor respondents were fairly well acquainted with the major settlement. The highest score of '6' for example, was in the vicinity of

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Figure 40: Parameter Aesthetics: Tourists

the Smiths Gore building, which was also highlighted as one of the more picturesque spots in a previous report (Shankland Cox, 1972). The industrial area around Port Purcell, on the other hand, received the lowest rating for the entire island, even lower than that for the Duffs Bottom refuse dump. Several comments were directed to the ugliness of this latter area, but also a few were more general in scope concerning the amount of trash; as one respondent remarked:

We found the beach areas lovely, but immediately beyond the sand we found dumped garbage and messy upkeep -- there is so much natural beauty that it is a shame to have it all messed up with trash.

Perceptions Toward Development

On the same sketchmap within the questionnaire, respondents were requested to delineate those areas which they would like to see developed for tourism in the future. As with the results for aesthetics, a composite matrix was constructed to portray development potential of the island according to culture group. A scale of 5 to 9 was used; if an area was not mentioned for tourism development, it received a neutral score of '5.' In the same manner as those for aesthetics, these rankings were included in the OASYS model.

Culture group perceptions toward development for tourism differed more markedly than those regarding aesthetic considerations. In general, the composite sketchmaps reflected fairly accurately the results of previous survey questions. The sample least enamoured with the prospect of further development comprised the visitor respondents, whereas those most in favor proved to be -- not surprisingly -- the high school sub-group.

Not only considered the most beautiful location, Cane Garden Bay was also chosen amongst the areas considered by the Tortolian sample as being most suitable for tourism development (see Figure 41). The enthusiastic

rating was accompanied with some words of caution, however -- that no hotel be built there larger than that which could be locally owned. The more remote Josias Bay on the northern coast, by comparison, was considered by some to be more suitable for development as a major hotel resort area. Other presently inaccessible northern beaches were recommended to be developed for public use.

More surprising to the author were the high development ratings given to some of the Islanders' favorite beaches, such as Trellis Bay on Beef Island; it had been presumed that the local popularity of these beaches arose not only from easy access, but also from the fact that they were not "taken over" by tourists. Almost the whole of Beef Island, in fact, -- most favorably considered aesthetically by Tortolians, but not by expatriates and visitors -- was given high ratings.

Road Town was the only large urban area singled out for tourism development. One respondent considered that another medium-sized hotel was needed in this area, and to be served possibly by a constructed beach. Inland, the Mount Sage National Park received high scores, implying at least greater accessibility to be afforded the tourist.

Not all belongers were contented with the way development had already occurred; as one respondent commented: "We think development is going too fast without enough thought being given to what our island looks like."

The ratings given by the high school students displayed some of the general patterns of the larger belonger group's preferences, but were far less subdued, as shown in Figure 42. Road Town, together with the northwestern coastline and Beef Island, were sprinkled liberally with ratings of '8' and '9,' and large inland areas were swathed with a '7.' In addition, the second largest urban area of East End/Long Look --

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barely affected by the newer types of construction that have occurred in Road Town -- was considered ripe for development. Such ratings reflected a typical comment made by one of the students: "the whole thing needs to be developed."

In contrast, the continental resident group was far more reserved in its ratings. The highest score given was an '8', and restricted to areas which had already experienced some form of resort development. Again, in contrast to the Tortolian sample, Cane Garden Bay was only given a score of '7', the same as Road Town and portions of the central flatter land of Beef Island. None of the inland slopes or interior uplands was constituted as appropriate for tourism development (see Figure 43).

The major theme of the comments by expatriates was the need for carefully controlled development of 'high quality', locally oriented with regard to cuisine, staff and ownership. One respondent remarked that there should be no more "Prospect Reefs or Wickhams Cays" - both large, externally funded and oriented developments. Another respondent wished further development on the north shore, at present handicapped by limited land access; Josias Bay, for example, was considered suitable by some for small hotels, as was Long Bay, Beef Island, but it was stipulated that both places not be developed. Rejecting physical development altogether, one respondent suggested more emphasis instead be placed on development of the "arts."

Visitor responses indicated that little, if any, further development was desired. The highest rating given was a '7', and then only sparingly: two beaches on the northwest coastline (already partially developed), a small portion of Road Town, and a beach on Beef Island. All other areas received scores no higher than a '6'. Comments were directed

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Figure 43: Parameter Development: Continental Residents

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Figure 44: Parameter Development: Tourists

toward the need for small, rather than large, operations, or for, simply, "no more development". . . . "Keep Tortola natural and beautiful."

Preferred Types of Development According to Area

The last section of the public survey questionnaire consisted of a matrix, listing types of areas in the columns and types of development in the rows. Respondents were requested to complete the matrix by giving scores, ranging from '1' to '9', to show how important each type of development should be within each of the five stipulated types of areas, or systems. The example was given that if respondents considered agriculture essential in a coastal rocky area, then this should be denoted by a score of '9'; on the other hand, if they considered agriculture to be not important at all in such an area, then the minimal score of '1' should be given.

The resulting values (Gamma-values) were utilized in the OASYS model for each culture group. A full listing of these Gamma-values appears in Appendix VIII. The highest rating given by any culture group was an '8', whereas the usual greatest mark of approval was a '7'.

Whereas the believer group and student sub-group preferred resort housing and hotel development for coastal lowland areas, continental expatriates in general showed no particular preference. Visitor respondents, on the other hand, shunned any man-made developments in such areas, and voted positively for natural vegetation. These latter two group samples also emphasized the importance of natural vegetation in coastal rocky areas.

On inland slopes, a preference for natural vegetation and agriculture was stressed by all sample groups. It is disturbing to note, however, that agriculture was given the same or consistently higher scores than natural vegetation, since the former could prove destructive

to the soil on steeper slopes. With regard to interior upland areas, natural vegetation and agriculture were again favored, with all other types of development rated lowly. Lastly, within urban areas, developed recreational areas and commerce generally were rated the most important, although the visitor group also placed some emphasis on natural vegetation and light industry.

If individual types of development, rather than areas, are considered, it is interesting to note that natural vegetation was rated highly by the visitors, irrespective of the type of area. The Tortolian group regarded natural vegetation only important on inland slopes and upland interiors. Similarly, agriculture was rated as being important for interior uplands, but surprisingly not for coastal lowland areas. Commerce was rated favorably only within urban areas.

Resort housing and hotels only scored well within coastal lowland areas, as did developed recreation, although the latter was considered more important in urban areas. Industry was rated only as being slightly important by the Tortolian group in coastal lowland areas, and by the student sub-sample in urban areas. In all other types of areas, and by all other sample groups, it received negative ratings.

Comments concerning this question were centered around the definition of "developed recreational areas." Emphasis was placed on "controlled" rather than "developed" areas per se -- that they be developed only so far as to "increase visitor awareness," and to be along the lines of a "natural national park type design."

Experts' Questionnaires

As previously noted in this chapter, three separate experts' questionnaires were distributed during the spring of 1975, addressing

agriculture, commerce and light industry and, lastly, hotel, resort and high-cost housing and developed recreational areas. In view of the complexity and length of the questionnaires, the proportion of returns was encouraging: 10 completed questionnaires out of 22 distributed for agriculture, 14 returned out of 30 distributed for commerce and light industry, and 15 out of 28 distributed for tourism related activities. From these responses, the Alpha-values for the parameters and Beta-values for the data types were determined, a full list of which appears in Appendices IX and X. A summary of the major findings of each survey is given below.

Agriculture

The same 1 to 9 ranking method employed in the public survey questionnaire was used to determine how experts evaluated the relative importance of eight different parameters with respect to agriculture. An adequate water supply was considered to by far the most important parameter (reflecting the low rainfall regime of Tortola), and was given a rating of '9'. In contrast, all other factors received marginal scores. These included type of soil, land values, slope (all with a rating of '6'), existing type of natural vegetation and accessibility to roads ('5'), size of land property ('4'), and, lastly, proximity to urban areas ('3').

Several other factors were proffered for consideration by the experts, including the availability of farm machinery and higher wages, the existing high cost of labor, the existing advanced age of farmers, the lack of an organized market for produce, the need for agricultural teaching in the schools, and lastly, the persistent stigma surrounding agriculture, a survival from slavery. Since none of these parameters

could be spatially portrayed, however, they were not considered in the OASYS model.

A matrix was then presented in the questionnaire, similar in design to that in the public survey counterpart, to determine the appropriateness of certain types of vegetation within seven different types of areas. Indigenous woodland was considered the most appropriate for "ghuts" (or gullies), vegetable crops for urban areas, a combination of vegetable crops and improved pasture for valley bottoms and coastal lowlands, tree crops and indigenous woodland for inland slopes, and scrub for coastal rocky areas.

Respondents were next asked to denote the most suitable types of characteristics for agriculture; for example, seven categories for the parameter size of land property, were presented, ranging from less than one acre to 100 acres or more. These findings were used to determine the Beta-values for the OASYS model. The respondents' consensus of opinion was that the most suitable land for agriculture would possess the following characteristics: it would be five acres or less in size, having a volcanic soil and with a slope less than 12 degrees, a low monetary value, be served by a secondary road and situated within two to five miles from a major urban area.

In order to determine any intrinsic value of natural vegetation types, the latter were rated by the respondents for their importance relative to each other. A low score would signify their potential conversion to other land uses, such as agriculture. Forest vegetation was most highly rated, with an intrinsic value of '9', followed by mangrove and woodland (both with a rating of '8'), and lastly scrub, with a relatively low intrinsic value of '5'.

Lastly, the respondents were asked what type of agriculture, if any, would they like to see replace certain types of vegetation. In mangrove areas, either hydroponics or no change in the vegetation was suggested. Scrubland was recommended for rough pasture, woodland for both rough pasture and tree crops, and forest areas for timber crops or otherwise protected.

Commerce and Light Industry

Factors considered most important for commerce were the slope of land and proximity to existing roads and power lines. Although all of these parameters received high ratings with regard to light industry, an adequate water supply and lowland values also were considered as equally important. Other factors mentioned by the experts included the need for management and technical skills, funding for capital investments, political stability, parking availability, as well as the availability of surface water and foul sewers. Although the latter factor was considered to be 'mappable', foul sewer systems are confined to the already developed areas of Road Town only, and thus this parameter was not included in the OASYS model. The factor of parking availability was presumed to be at least partially covered by the parameter, slope of land.

Judging from the experts' responses, the ideal commercial site in Tortola would comprise a property sized five acres or less, with flat land and medium to high land values, and located adjacent to or within one mile of residential areas and existing commercial and harbor facilities. The respondents favored a larger property area of six to 19 acres, with a medium to low monetary value, for light industry. This latter area also would be two or more miles distant from residential areas, would be immediately adjacent to existing light industrial areas

and within one mile of harbor facilities, and be served by an existing major road and power lines. The existing land use preferably would be scrub.

Finally, the experts were asked to list the types of commercial and industrial activities they would like to see developed, or further developed, in Tortola. Responses were varied, but commercial activities generally were associated with tourism and international financing, while industrial activities preferably would be labor intensive, non-polluting and affiliated with agricultural and fishing products.

Hotel, Resort Housing and Developed Recreational Areas

This tourism-related questionnaire originally was designed with only two major categories to be considered -- first, hotel, resort and high-cost housing, and secondly, developed recreational areas. After consultation with experts in Tortola, however, the author amended the questionnaire to include three major categories, with hotels being considered separately from resort and high-cost housing.

In assessing the relative importance of parameters, the experts' consensus was that water supply and proximity to the sea were significant for the siting of hotels, whereas land prices and aesthetic values were mentioned with regard to resort housing. Several factors were considered co-equal in importance for developed recreation areas.

Characteristics best suited for the development of an hotel were considered to include a property area of six to 19 acres, having little or no slope and served by existing communications and power lines. The site would need to be located at least a distance of one mile from the nearest urban area, and over two miles from existing hotels. In addition, the site would be immediately adjacent to the sea and in an area of high aesthetic quality where woodland vegetation prevailed.

Resort and high-cost housing would best be developed, according to the respondents, on an area of one to five acres, with low to moderate slope, and located near at least a secondary road and power lines. Ideally, the site would be located relatively near the coast and an existing urban area (these parameters are shown in Figures 45 and 46), but away from other resort residential areas. The best existing land-use would again be woodland.

Finally, the expert panel considered that developed recreational areas would best be located on areas at least six acres in size and having a flat topography and a low existing land value. The site should be served by an existing major road and be immediately adjacent to an urban area. A natural vegetation of woodland was considered to be slightly more important than proximity to the sea and high aesthetics, although all of these factors were desirable.

When asked to evaluate different types of areas for tourism associated development, the respondents chose flat coastal areas to be most appropriate for all types of development, with the exception of high-cost homes which were also considered appropriate in coastal rocky areas and interior uplands.

In order to compare the experts' perceptions with those of the general public, the former were asked to rate the suitability of different types of development for Tortola. Marinas received the highest rating, followed by small hotels and medium-sized hotels (which were rated co-equally), high-cost residential homes, visitor apartments and condominiums, developed recreational areas, and lastly, with by far the lowest rating, large hotels. The actual average ratings for all three experts' questionnaires are listed in Appendices IV, V and VI.

LEGEND

- 1. Within less than 1/4 mile (0.4 km)
- 2. Between 1/4 mile and 1 mile (0.4 km-1.6 km)
- 3. More than 1 mile (1.6 km) distant



Figure 45: Parameter Proximity to Coast

Results of the OASYS Program

Using the three sets of weighting values (Alpha, Beta and Gamma) obtained from the various questionnaires, together with the total of 17 parameter maps as data inputs to the OASYS model, the four composite suitability maps shown in Figures 47, 48, 49 and 50 were derived. As a cautionary note, it is suggested that the exact location of favored development areas be not interpreted too literally, since both the map scale and the representative size of each cell block prohibit any precise siting. Rather, more relevant are the general placement of sub-systems, the overall combination of these sub-systems and their relative position to each other.

It should also be noted that the composite maps do not purport to be land-use plans per se, since they do not take into consideration the overall requirements of the island's population for various resources. The maps represent merely the spatial patterns of culture group preferences within the context of certain physical constraints.

Each alphabetical symbol on the composite maps represents the most suited sub-system -- or land-use -- for that particular cell block, based upon the data inputs to the OASYS program. For the purpose of analysis, only those areas with a distinctly favorable rating of '7' or above were considered. While the total mix of cell blocks is interesting in gauging the general tenor of each culture group sample's preferences, several of these blocks received only neutral or marginal ratings for even the most suited type of development, and thus were not included in this study for potential development.

An overall similarity between the composite maps in the configuration of the higher rated cell blocks may readily be observed. This is to be expected, since the research model's structure was designed purposely

LEGEND

- A - Agriculture
- C - Commerce
- H - Hotels
- I - Industry
- N - Natural Vegetation
- R - Developed Recreational Areas
- V - Visitor Resort Housing

All shaded cell blocks denote a rating of '7' or above



Figure 47: Composite OASYS Map: Tortolians

LEGEND

- A - Agriculture
- C - Commerce
- H - Hotels
- I - Industry
- N - Natural Vegetation
- R - Developed Recreational Areas
- V - Visitor Resort Housing

All shaded cell blocks denote a rating of '7' or above



Figure 48: Composite OASYS Map: High School Students

LEGEND

- A - Agriculture
- C - Commerce
- H - Hotels
- I - Industry
- N - Natural Vegetation
- R - Developed Recreational Areas
- V - Visitor Resort Housing

All shaded cell blocks denote a rating of '7' or above



Figure 49: Composite OASYS Map: Continental Residents

LEGEND

- A - Agriculture
- C - Commerce
- H - Hotels
- I - Industry
- N - Natural Vegetation
- R - Developed Recreational Areas
- V - Visitor Resort Housing

All shaded cell blocks denote a rating of '7' or above



Figure 50: Composite OASYS Map: Tourists

to bound the freedom of the culture groups' perceptual desires by the physical realities and constraints of Tortola's demanding physical terrain.

As could be expected from the results of the public questionnaire survey, of all the sample groups the high school students were most in favor of hotel and resort housing development, but least desired further commercial development and preservation of the natural vegetation. The composite maps for the Tortolian sample as a whole and the continental residents portrayed the greatest similarities, but it may be noted that all three resident groups' maps more resembled each other than they did the visitors' map. One commonality amongst all maps was the negative response shown to both industrial and developed recreational expansion. Below is a brief description regarding preferences for each individual sub-system.

Natural Vegetation

As noted earlier, the high school sub-group's map was the only one in which no cell blocks were allocated to this land-use. In the Tortolian composite map, the parameter was limited to steeply inclined, coastal rocky areas, whereas in the expatriate and visitor maps it was extended to include extremely steep inland areas, such as in the vicinity of ghuts.

Agriculture

This sub-system was allocated by far the greatest number of higher-ranked cell blocks, and was the only one to receive a score higher than '7'. Its general confinement on the maps to the interior upland areas reflects the present status quo of agricultural pursuits. Of the three resident culture groups, agriculture was most favored for development by continental expatriates, and least favored by the high school students.

The composite map for visitors portrayed a preference on their part for natural vegetation rather than agriculture in many inland and coastal areas.

Commerce and Industry

No cell block was rated most suitable for industry, let alone received a rating of '7', in any of the composite maps, even in areas of existing industrial activities such as in Road Town. Only slightly greater favor was bestowed upon commercial development. The Tortolian, expatriate and visitor composite maps all displayed the three, nominal cell blocks near Fat Hogs Bay -- the scene of earlier commercial endeavors by John Pickering and his fellow Quakers in the mid-18th century (Jenkins, 1923). The composite map for the high school respondents reflected their apparent lack of interest in commerce by designating no high scoring cell block for this sub-system.

Developed Recreation

Again, no rating of '7' was given to this land-use in any of the composite maps. It is interesting to note, however, the spatial pattern of those areas considered only marginally favorable. In all three composite maps for the resident groups, developed recreational activities were considered best suited for many areas of Road Town, whereas the visitors' map allocated commercial and hotel development to these areas. Conversely, whereas the visitor map designated large areas of Beef Island for this land-use, the map for the believer sample portrayed these same areas as best suited for hotel development. Generally, it may be said that the higher scoring areas were restricted to the more populated and developed southern coastal area.

Hotel and Resort Housing Development

Almost exactly the same spatial pattern for hotels was exhibited by the three resident group maps. In complete contrast, no area was distinctly favored on the visitors' map. The concentration of cell blocks on the latter map with a score of '6' in the Road Town area, however, suggests that if further hotel development did occur, visitor respondents would prefer it to be contained within already urbanized areas, and not to occur within otherwise unspoilt locations.

Resort housing development was little favored in any of the composite maps, although a few cell blocks were allocated in the student map along the northern coast. The believer and the expatriate maps delineated only one cell block, located on Beef Island and the site of a planned -- though as yet unrealized -- resort housing project. No areas on the visitors' composite map were allocated to this sub-system.

Potential Tourism Development According to Culture Group

The findings presented in this section must be considered as addressing only a few -- albeit previously largely ignored -- aspects of the multi-faceted concept of carrying capacity. In evolving a future limit to the growth of tourism, several other considerations -- which are outside the scope of this analysis, as well as the expertise of the author -- should be borne in mind. For example, the island's more sensitive ecosystems (such as those found in Mount Sage National Park or in coastal fringing reefs) can withstand only a finite amount of visitation and disturbance before they deteriorate. Certain man-made infrastructural systems may exhibit different thresholds before their capacities are exceeded. Imbalances within the economy may become

sufficiently serious as to warrant a halt in growth, or perhaps merely building demand may exhaust the supply of 'developable' sites.

As mentioned in previous sections, the different scenarios for growth outlined below are based upon the preferred development, according to each culture group sample, of those areas that were delineated by the OASYS model as fulfilling most of the experts' provisos for development, as well as most of the respondents' perceptual requirements. It is assumed that the necessary infrastructure and support services needed to implement the growth scenarios would be forthcoming from either the public or private sector.

Preferred Hotel Development

Except for that of the visitors, the same twelve sites were depicted as being suitable for hotel development on all composite maps. The majority (8) of these sites were located on the undeveloped northern coast, with the remainder situated on Beef Island (3) and the southern coast (1). The latter site already harbors an existing hotel ('Colonial Manor'), and offers little capability for an additional hotel, and thus was not included in the analysis.

In deference to the experts' opinion that hotels should not be immediately adjacent to each other, only one hotel operation was allocated to each site. It should be noted that some of the chosen sites on the northern coast (such as Long Bay and Capoons Bay) already have existing hotels, but still allow adequate space for additional development.

The definition used for a "large" hotel was one of 100 beds, in order to allow consistency with the information given to respondents in the public survey questionnaire. Although this is not as large as certain existing hotels within the Territory, and certainly far smaller

than some of the hotels in neighboring St. Thomas (the Virgin Islands "Hilton," for example, offers 209 rooms), such an operation must be considered large in relation to most hotels presently operating in Tortola.

A "medium-sized" hotel was defined as one of 35 beds, and which could be operated by the manager and a modicum of full-time staff.⁷ A "small" hotel or guest-house was considered to provide about 12 beds, and to be run primarily by the manager with part-time help at meal times.⁸

In determining the number of visitors that would be associated with each preferred development scenario, the 1974 overall annual bed occupancy rates of 50 percent for large and medium-sized hotels and 32 percent for small hotels were utilized (Evans, 1975c, p. 74).⁹ In addition, the average length of stay for hotel guests in 1974 (6.9 days) was used (Evans, 1975c, p. 8).

In order to allocate a suitable mix of types of hotels for each scenario, the sample groups' first-choice preferences were used, as previously depicted in Table 12. For example, since 21 percent of the believer respondents most favored large hotels, then that same proportion of the eleven delineated sites on the composite map (in this instance, two sites) was assigned to large hotel development. With the use of all the above assumptions, the potential number of hotel visitors associated with each of the four development scenarios is shown in Table 19.

As may readily be seen, the preferred number of tourists varies greatly according to culture group scenario -- from over 20,000 as inferred by the high school responses to a corresponding number of nil for visitors. The scenarios for the believers and continental residents are closest, being approximately 10,700 and 9,000, respectively. All of

Table 19: Scenarios for Additional Hotel Development
According to Culture Group Preferences

<u>Culture Group</u>	<u>Hotel Size</u>			<u>Total</u>
	<u>Large</u>	<u>Medium</u>	<u>Small</u>	
<u>Tortolians</u>				
Hotel preference (%)	21	46	33	100
Number of preferred sites	2	5	4	11
Total Beds	200	175	48	423
Ave. occupancy/night ^{1/}	100	88	15	203
Total bed nights	36,500	31,938	5,606	74,044
Tourist equivalence ^{2/}	<u>5,292</u>	<u>4,629</u>	<u>813</u>	<u>10,732</u>
<u>High School Students</u>				
Hotel preference (%)	65	19	16	100
Number of preferred sites	7	2	2	11
Total Beds	700	70	24	794
Ave. occupancy/night ^{1/}	350	35	8	393
Total bed nights	127,750	12,775	2,803	143,328
Tourist equivalence ^{2/}	<u>18,514</u>	<u>12,775</u>	<u>406</u>	<u>20,771</u>
<u>Continental Residents</u>				
Hotel preference (%)	7	53	40	100
Number of preferred sites	1	6	4	11
Total beds	100	210	48	358
Ave. occupancy/night ^{1/}	50	105	15	170
Total bed nights	18,250	38,325	5,606	62,181
Tourist equivalence ^{2/}	<u>2,645</u>	<u>5,554</u>	<u>813</u>	<u>9,012</u>
<u>Visitors</u>				

Source: Original research.
Evans, 1975c.

1/ Assumes 1974 average occupancy rates, which were 50% for large and medium-sized hotels (as herein defined) and 32% for small hotels and guest-houses (Evans, 1975c, p. 8).

2/ Assumes 1974 average length of stay, which was 6.9 days (Evans, 1975c, p. 8).

these figures would be additional to the author's own estimate of 6,250 hotel guests who stayed in Tortola during 1974.¹⁰ The development scenario for the high school students would therefore represent an increase of 332 percent in hotel guests over 1974, while those for the longer and expatriate samples would represent increases of 172 percent and 144 percent, respectively.

The degree of impact which any of the scenarios would have on the human and physical resources of Tortola would be highly dependent upon the time-frame in which these scenarios occurred. Although the public survey questionnaire did not stipulate what precisely was implied by the term, "in the future," for the sake of analysis it was limited to a period which could reasonably have been foreseen, such as ten years. Thus, the year 1985 was used in comparing the findings of this research with those of previous development plans and reports.¹¹

Preferred Visitor-Owned Development

In estimating the potential visitor accommodation to be provided by this source, an average size of 20 beds for each development was assumed, and that overall average annual occupancy was in the order of 30 percent, including owner occupancy. It was further assumed that the average length of stay would be 7.8 days, which was obtained by averaging the overall lengths of stay in rented accommodation and owner accommodation in 1974 (the respective figures being 8.9 days and 6.7 days; Evans, 1975c, p. 8). The resulting figures for each culture group scenario are depicted in Table 20. Even the highest number for the high school students (1,123 visitors) is relatively low, emphasizing the seeming unpopularity of such development among those polled during the survey period.

Table 20: Scenarios for Additional Visitor-Owned Development According to Culture Group Preferences

<u>Category</u>	<u>Culture Group</u>			
	<u>Tortolians</u>	<u>Students</u>	<u>Continental Residents</u>	<u>Visitors</u>
Number of preferred sites	1	4	1	0
Total Beds ^{1/}	20	80	20	0
Ave. occupancy/night ^{2/}	6	24	6	0
Total bed nights	2,190	8,760	2,190	0
Tourist equivalence ^{3/}	281	1,123	1	0

Source: Original research.
Evans, 1975c.

1/ Assumes average visitor-owned development to have 20 beds.

2/ Assumes 30% occupancy, including owner occupancy.

3/ Assumes average stay of 7.8 days; derived from Evans, 1975c.

Table 21: Total Preferred Tourism Accommodation
Development by Culture Group

<u>Beds</u>	<u>Culture Group</u>			
	<u>Tortolians</u>	<u>Students</u>	<u>Continental Residents</u>	<u>Visitors</u>
Additional hotel	423	794	358	0
visitor-owned	<u>20</u>	<u>80</u>	<u>20</u>	<u>0</u>
Total additional	453	874	378	0
<u>Tourists</u>				
Additional hotel	10,732	20,771	9,012	0
visitor-owned	<u>281</u>	<u>1,123</u>	<u>281</u>	<u>0</u>
Total additional	11,013	21,894	9,293	0

Source: Original research.

Note: The number of preferred additional beds may be compared with an estimated 270 hotel and guest-house beds and possibly 200 visitor apartment beds existing in Tortola in 1974.

The number of visitors staying at hotels and guest-houses in the Territory in 1974 were 14,656 (Evans, 1975c, p. 8). No comparative figure is available for visitors staying at condominium-type developments.

Overall Development Scenarios

The combined number of visitors using hotel and resort housing accommodation by 1985, as deduced from the results of the OASYS program, is shown in Table 21 for each culture group sample. These figures do not account for even a majority of the tourists that could be expected to visit Tortola in 1985, however. Of the total of 58,486 tourists who arrived in the Territory in 1974, for example, only 14,656 (25 percent) stayed at hotels and 326 (0.6 percent) rented accommodations. Of the remainder, 13,453 (23 percent) stayed on charter boats, 12,912 (22 percent) stayed on their own boats or were cruise ship passengers, 6,425 (11 percent) stayed in their own accommodation or with friends, and 10,713 (18 percent) were merely day tourists (Evans, 1975c, P. 8).

The potential for growth of any of these other tourist categories cannot adequately be analyzed within the OASYS model and by the parameters used in this study. The delineation of suitable marinas would require an extension of data to include bathymetric readings, sea access and possibly even prevailing currents. In addition, the land carrying capacity for charter boat clientele would be largely dependent upon the duration of their stay ashore and their use of facilities. Should the charter boat industry continue to grow as rapidly as it has done over recent years (as discussed in Chapter III), then increases in this sector could easily match or surpass most of the growth scenarios envisaged for hotel and resort housing visitors.

The cruise ship industry has fluctuated so dramatically in recent years that any prediction could prove drastically erroneous. For example, whereas this sector accounted for 2,004 visitors in 1973, the corresponding figure for 1974 was only 664 (Evans, 1975c, P. 8).

Thus, no projection for the total number of tourists for 1985 was attempted. The results of the public questionnaire survey can only hint in a qualitative fashion about the number of tourists that would be desired -- "far more" by the belongers, "more" by the expatriates, and "about the same" by those visitors who were in the island in 1974-75. Only that number of tourists suggested by the culture group responses that would stay in hotels and resort housing, therefore, is compared in Chapter VI with the findings of previous studies.

Notes

1. As a pre-testing for potential use with in-season tourists, an additional page was appended to public survey questionnaires distributed during the month of November, 1974, with questions pertaining to the age, sex and place of residence for visitors only. These questions were largely ignored, however, and no comparison could be made with Government data for the corresponding month a year earlier.
2. The only exceptions to this procedure occurred when the author addressed two civic clubs (the Lions and Rotary), where questionnaires were distributed and collected during the meetings.
3. This population may be defined as all British Virgin Islanders born in the Territory and residing in Tortola. It thus includes a small number of people that were born in other islands of the Territory, such as Virgin Gorda and Anegada. For the sake of simplicity, however, this group hereafter is referred to merely as 'Tortolian'.
4. Since the high school in Road Town is the Territory's only center for secondary education, the students are derived from all of the Islands. It was considered, however, that as a group the students would fairly closely reflect the opinions of youths their own age in Tortola.
5. The sample size percentage may well be larger, since all tourists to the Territory -- and not merely Tortola -- were included in the target population. This approach was necessitated because no reliable data exist concerning the number of tourists who briefly visited Tortola but stayed primarily on other islands such as Virgin Gorda. Also, lack of data prevented those tourists aged 14 years or less being omitted from the target population.
6. The author is fairly confident that if more visitors had been aware of the north-eastern area, especially Josias Bay, that area would have received a more favorable rating.

7. Examples within the British Virgin Islands would be "Sebastians" (30 beds) and "Marina Cay" (32 beds).
8. Examples of this type of establishment would be the "Lord Nelson Inn" and "Fischers Cove Beach," both of Virgin Gorda.
9. A "large" hotel is defined by the British Virgin Islands' Statistics Office as one having more than 20 rooms. Since a "medium-sized" hotel as meant in this study falls very closely to the lower limit of this definition, an overall occupancy rate of 50 percent was used rather than the lower rate of 32 percent.
10. This estimate was based upon the average number of hotel beds available in 1974, and length of stay and occupancy characteristics of overnight visitors for 1974 (Evans, 1975c).
11. Since completion of the field research period, the opening of "Prospect Reef," with its 322 beds, has had a dramatic impact upon the provision of hotel accommodation in Tortola. Rather than negating any of the OASYS program findings, the opening of such a large hotel only emphasizes the occasionally vast discrepancies between peoples' preferences and the realities of development. It is interesting to note that the construction of "Prospect Reef" was ongoing during the period when the public survey was being conducted.

CHAPTER VI COMPARISON OF THE OASYS RESULTS WITH PRIOR DEVELOPMENT STUDIES

Introduction

In an article that laid much of the groundwork for subsequent economic studies (among which were Phillips, 1966; Bryden, 1970, 1973), O'Loughlin considered that diseconomies of scale associated with a population of 30,000 or less were so severe as to cause emigration to be "a continuous economic problem" (1962, p. 1). The same author stated some years later that many islands, "particularly those with less than 10,000 people," simply could not support an expanding population (1968, p. 6).

As discussed in Chapter III, the Territory for most of this present century has provided an almost perfect example for both of O'Loughlin's contentions, with wage labor traditionally having comprised one of its largest exports. Because of continual out-migration, the population of the British Virgins increased at an annual rate of less than one percent between 1901 and 1960, reaching 7,340 in the latter year.

As a result of a substantial growth in the tourist sector -- and hence in the economy in general -- since the early 1960's, the Islands' population has increased far more rapidly, surpassing 10,000 persons by 1970. It may be stated unequivocally, therefore, that the economic carrying capacity of the Territory has been greatly increased as a result of tourism.

The type and nature of future growth, however -- and especially the potential limits to that growth -- have been the subject of frequent debate and discussion with widely varying policies and projections being propounded. Although several reports have suggested overall guidelines for the development of tourism in the Territory as a whole, few have attempted to more precisely indicate the spatial allocation of such development. Some of these prior reports and studies are outlined below in order to facilitate comparison (if allowing) with the results of the present analysis.

Initial Research and Comments (1958 - 1970)

The development of the British Virgin Islands through a burgeoning tourism industry was not advocated by all initially. Because of the heavy capital investment required and the dependence upon external factors which heavily influenced tourist demand, Frampton and Biggs favored a revamping of the agricultural sector, rather than encouraging tourism:

. . . it would clearly be unwise to rely on (the tourist industry) as a means of developing the Virgin Islands. On the other hand there are good prospects for development in the fields of agriculture and fisheries. . . . (1958, p. 1)

The continued rapid growth of tourism in the neighboring American Virgin Islands throughout the 1950's, as well as an increased interest in tourism ventures within the British Islands themselves, however, dictated a reappraisal of this stance by many observers. Kingsbury (1960) cited several development schemes that had been proposed by private concerns, including a gambling casino on Beef Island, replete with a 200-room luxury hotel, shopping center, resort residential housing and a "non-identifying" bank. Although wary of this particular scheme (as rightly so were the Government), Kingsbury greatly favored the development of a

56-acre tract that had been recently acquired by Laurence Rockefeller in Virgin Gorda. Similar in scope and design to the existing Rockefeller resort of "Caneel Bay Plantation" in neighboring St. John, Kingsbury considered this planned development to be "just the 'shot in the arm' that these islands long have awaited" (1960, p. 24).

With the recent experience of St. Thomas in mind, however, he uttered a cautionary note with regard to the number and type of tourists that should be accommodated:

. . . the entrance of large numbers of retired and/or moneyed Canadians and Americans living in luxurious permanent homes does not appear too desirable. While it would add money to the islands it would bring also ". . . snobbery, racial inequality, and local resentment . . . [and] establish a class of local people in the socially and economically inferior class . . . and more local resentment".¹ The islands simply have too few residents to support this type of tourist invasion. Even in St. Thomas, where the total population is over twice the entire British Virgins, a very large socially inferior class and resulting local resentment are in evidence. (1960, p. 24)

Instead, Kingsbury was partial to the development of a market for American middle-income tourists, the type that ". . . wants adequacy but neither needs nor wants to pay for extreme luxury" (1960, p. 24).

This latter sentiment was echoed by Carleen O'Loughlin (1962), who argued strictly on the grounds of economic returns. Certain types of development, in her opinion, should be prevented, since they underutilized available resources; for example, a beach area developed for the use of a few rich tourists would not benefit national income and employment as much as a development catering to a larger number of lower-paying tourists. In sum, "middle-income tourism is more desirable than high-income tourism" (1962, p. 8).

As an example for growth in the tourism industry, O'Loughlin cited the experience of Antigua, which by 1960 was receiving more than 16,000 visitors, resulting in direct and indirect contributions to gross domestic product of \$2.8 million. These expenditures were related to 500 hotel and guest-house beds, in addition to "the Mill Reef Club and residential settlement," and to an employment base of 1,500 man-years, including the work of women and children. The potential of the British Virgin Islands, according to O'Loughlin, was greater:

The present resources . . . would permit of rather more development (perhaps 50 percent or more) without undue strain on labor resources and about three times as much development before the margin of site resources was approached. (1962, p. 9)

Assuming that everything remained constant, therefore, O'Loughlin had suggested that the Territory could absorb perhaps 1,500 hotel and guest-house beds, plus a non-quantified number of resort residential houses, before any physical constraints became apparent.

In order for "financial viability" of the Territory to be approached by 1975, O'Loughlin proposed a development plan that assumed, among other things, an additional 100 beds to be added each year during a ten-year period commencing in 1966. It was also assumed that between 25 to 50 "retiree" households would be located in the Territory by the end of the period.

Irrespective of whether the above would or would not have achieved financial viability, hotel accommodation has not kept pace with O'Loughlin's preferred rate of growth. The average number of available hotel beds during 1974 was in the order of 640 -- about half that envisaged by O'Loughlin for 1975 -- although the subsequent opening of the 322-bed "Prospect Reef" soon after that date certainly narrowed the difference between projections and reality.²

A comparison between O'Loughlin's findings and those derived from the OASYS program and survey questionnaires is hampered by the fact that no attempt was made by O'Loughlin to distribute projected hotel beds according to individual island. It appears probable, however, that the two sets of results do not differ that greatly. Including those hotel beds already existing in Tortola at the time of the survey (approximately 270, though this number fluctuated because of hotel openings and closings), the results for the Tortolian and continental resident samples suggested carrying capacities for the island of about 690 and 630 hotel beds, respectively, while those for the high school students implied a higher figure of 1,060 beds. These first two numbers are only moderately higher than using O'Loughlin's estimate of 1,500 beds for the whole Territory, if it is assumed that Tortola maintained its 1974 proportion of the Islands' total beds (35 percent), thus allowing a total of 525 beds in Tortola. In order to achieve the high school students' scenario, two-thirds of the Territory's number of beds suggested by O'Loughlin would need to be located in the island by 1985 -- quite possible, considering the recent "Prospect Reef" development and the potential for further substantial growth along the undeveloped northern coast.

The completion of Rockefeller's "Little Dix Bay" in 1964 (the type of development not approved by O'Loughlin) provided "a striking example of the profound impact that a luxury vacation facility of only 50 rooms can have on an economy the size of the British Virgin Islands." So wrote Phillips (1966, p. 2), then United Nations advisor to the Government, in a report outlining the formulation of a six-year development plan for the Territory. Although urging the Government to undertake major infra-structural improvements to induce additional tourism development, he cautioned that a careful economic feasibility study should be undertaken

"which relates the costs to the benefits which will accrue to the economy" (1966, p. 16).

Phillips' development plan, which he scheduled from 1966 to 1971, called for an additional 400 hotel rooms by the end of the period. These rooms were to be divided evenly between large and small establishments. Provided that adequate access to the Territory was assured, Phillips envisaged at least 20,000 visitors staying in hotels each year by 1971. In addition, he projected the construction of 150 houses for "vacationer-investors and retirees" (1966, p. 19). With such growth, he believed that government revenues would be sufficient to ensure a balanced budget.

Phillips' target growth for hotel accommodation was not achieved. According to the West Indies and Caribbean Year Book (1972), the Territory in 1971 still only offered a total of 308 rooms. He made no estimate concerning the optimal number of rooms in the long-term, and thus it is difficult to compare his findings with the OASYS results. It may be noted in passing, however, that if over two-thirds of the 20,000 guests he envisaged staying in hotels by 1971 were to have been located in Tortola, then the carrying capacities suggested by the OASYS program for the Tortolian and white expatriate group samples would already have been approached.

Development Planning in the 1970's

The rapid growth of tourism facilities during the 'boom' years of the late 1960's, and the initiation of grandiose schemes that threatened to overwhelm the Territory's small economy, necessitated a reappraisal by the British Virgin Island's Government of the newborn but rapidly burgeoning tourism industry. More than their predecessors, the studies

conducted during this present decade have attempted to define the role of tourism in attaining certain desirable economic and social goals.

The Shankland Cox Report

A relatively comprehensive study of the potential for tourism development in the Territory was undertaken in 1972 by Shankland Cox and Associates, a British consulting group. Appointed by the Overseas Development Administration of the Foreign and Commonwealth Office on behalf of the British Virgin Islands' Government, the group's task was to undertake a study of the development possibilities of Wickhams Cay, a large land-fill project located in Road Town. Their findings (hereafter referred to as "the Report") have played an important role in shaping existing government policy towards tourism, and as such merit careful consideration.

According to the Report (1972, p. 41), hotel accommodation in the Territory comprises three major types: the "really luxury hotels... usually in isolated locations close to a good beach," the "slightly lower standard, but still expensive" hotels within and surrounding Road Town, and the smaller guest-houses located either close to the sea or within Road Town. The Report envisaged that most of the future growth would be provided in the first category, but that some moderate growth may be needed eventually to cater to increased needs within Road Town.

The Report then outlined a "tourist development strategy," which:

. . . simply identifies those features which seem to give the Islands a comparative advantage over other holiday destinations for the purpose of establishing an outline guide to the way in which tourism could best develop.
(1972, p. 43)

Identification of the features, or "special attractions," would allow a rational decision to be made concerning the type of tourist that would best be catered to. Once this decision was related to more general socioeconomic and environmental objectives, "a basis is laid for a policy

of controlled growth in the interests of both the people and the tourist" (1972, p. 43).

The four major assets of the Territory were considered to be the relationship between the water and the land, the natural undeveloped state of the Islands, the quality of the scenery and the excellent sailing and fishing available. These factors suggested the development of an industry which should be oriented towards the sea, and one which would not disrupt the unspoiled nature of the Islands.

The strategy outlined in the Report thus would have two components. The first would be the sea-oriented activities of yachting and fishing, based in areas where intensive development could occur in order to accommodate supportive facilities such as shops, apartments, marinas and slipways. The second component would cater to the primarily land-based tourist, along the existing lines of isolated hotels offering peace and tranquility. The development of these two major components did not necessarily preclude more moderately priced accommodation, however. The general objective of the overall policy was to:

. . . strike a balance between the need to develop the tourist attractions for the benefit of the economy, without at the same time destroying what make them attractive in the first place. (1972, p. 48)

Hotel development should be restricted in "size, location, form and total capacity," with dispersed hotels in a few selected beaches and islands. The Report also encouraged the idea that as many islands as possible be identified where no development would occur. Certain of the bays should remain only accessible from the sea. Subdivisions for villas should be restricted to a few sites only, since they "could destroy the scenic and atmosphere quality of the islands more rapidly than any other form of development" (1972, p. 48).

The above strategy, according to the Report, would limit tourism to far below the Territory's "potential market share," but any greater development "will gradually erode the 'get away from it all' quality." The specific desired rate of growth ought to be determined by an assessment of direct and indirect benefits and costs; because of the lack of available information, and since the latter was outside its terms of reference, however, the Report instead discussed certain development opportunities and constraints.

A major constraint was considered to be imposed by the existing and projected size of the resident labor force. Too much development would only result in the further immigration of foreign workers. Although the Report conceded that some further immigration was inevitable, the objective was to avoid excessive reliance upon this source of labor.

The existing engineering infrastructure was not considered a "critical" constraint to tourism development; on the contrary, the latter "provides many opportunities for fuller exploitation" (1972, p. 50). Water and sewage disposal were usually provided by the private sector, and increased use of the electricity system and airport would achieve economies of scale. The road system, the Report continued, would need to be improved anyway for domestic use, and increased investment resulting solely from tourism would be unlikely unless the latter's growth became "excessively high." It was conceded, however, that the demand upon the social infrastructure (such as schools, housing and health facilities) could become a critical constraint at some point.

The Islands' environmental quality again provided both opportunities and constraints in that, although it enabled a sector of the tourist market to be captured, its overdevelopment would destroy those qualities which the tourists desired. Finally, the Report addressed the

construction industry. In order for this sector to maintain its position within the economy, it was estimated that an additional 4,000 visitor beds would need to be built by 1986. Any great shortcoming of this figure would not utilize the "reasonable potentiality of the industry for expansion" (1972, p. 51). All four areas of constraints and opportunities had to be viewed, according to the Report, in light of the generation of government revenue.

The Report then proceeded to evaluate three alternative rates of growth. At one extreme, development could be dictated solely by market forces, in which case it was estimated that the total number of visitors to the Territory would approximate 104,000 in 1976, 260,000 in 1981, and 418,000 by 1986. In the latter year, a total of 9,740 visitor beds would be required, of which 5,358 were predicted to be needed in hotels. This growth was discounted as unacceptable, since it would place too great a strain on the economy as well as environmental and social parameters.

At the other extreme, it was postulated, would be a rate of growth that was constrained by the availability of the then existing labor supply. Under this scenario, the number of visitors would increase to 64,480 in 1976, 84,500 in 1981, and 107,040 by 1986. The number of visitor beds required in these years would be 1,270, 1,861 and 2,300, respectively (1972, p. 57).

Although the Report admitted that this level of development would little affect the existing character of the Islands, it believed that the market pressure for development would be too great to allow the imposition of such rigid controls. In addition, the Report considered that if insufficient use of existing infrastructural investment was made, some of the larger construction companies then in the Territory would leave. In addition, even under this limited growth scenario, some continuing

immigration would be required to provide certain needed skills, thus creating a corresponding amount of local unemployment. Although construction of visitor accommodation would remain at the 1970 building rate, providing an annual average of 104 beds over the fifteen-year period to 1986, the Report discounted this development alternative, since it would "not fully exploit the existing opportunities for expanding the economy" (1972, p. 58).

Having rejected both of the above development alternatives as being "unacceptable" or "unfeasible," the Report then proceeded to outline its preferred planned rate of growth. This was based primarily on three factors. The first was that growth should allow some additional immigration, but "not at such a level that it would overwhelm the local population" (1972, p. 58). Secondly, the "quantity of accommodation should provide sufficient flexibility for a reasonable distribution of facilities throughout the islands without destroying their special attraction" (1972, p. 58). Thirdly, "the rate in the early years should more closely approach market and development pressures to allow time for the setting up of control machinery" (1972, p. 59).

Under these circumstances, the Report continued, a rate of growth permitting the provision of some 3,500 beds in 1986 "would appear to be reasonable," although the Report admitted that a "slightly higher" rate of population growth would occur than would have been naturally generated. Under this growth alternative, the number of tourists to the Islands would be 71,170 in 1976, 116,340 in 1981, and 156,180 in 1986. The number of beds needed for the corresponding years would be 825, 1,275 and 1,925, respectively (1972, p. 60). Using this preferred rate of growth as a basis for visitor demand, the Report then assessed the potential for development on Wickhams Cay.

As previously discussed in Chapter III, Wickhams Cay comprises two separate landfill areas totalling 73 acres. The larger parcel of land (57 acres) is located immediately adjacent to Main Street, the traditional center of commercial activity of the Territory. Although it is almost inevitable that the present character of this street would be altered substantially by a full-scale development of Wickhams Cay, the Report considered that it would be "difficult to argue for the retention of the charm and character of the street except in a few specific areas" (1972, p. 67).

With regard to development on Wickhams Cay itself, the Report estimated that approximately 500 of the additional 654 visitor and immigrant apartments needed in the Road Town area under the preferred rate of growth could be supplied on the Cay. In addition, the planned development called for the provision of a marina with 300 berths, a hotel of 200 beds (although initially only 100 beds might be supplied), and a reserve allocation for a second hotel of the same size (1972, p. 109). The Report's plan also called for the development of international financial activities, bars, restaurants, shops, night clubs, a cinema, and commercial and administrative offices.

Since its publication, the Report has not only played a vital role in the planning of tourism growth, but also in the actual implementation of that growth. The first stage of the marina was not only built but in business by the end of 1975, in addition to which there was a restaurant, accommodation and other supporting facilities. In light of the tremendous impact that the Report's findings -- if fully implemented -- would have on the tourism industry in Tortola, some of its presumptions and conclusions are discussed below, and its findings compared with those suggested by the OASYS program.

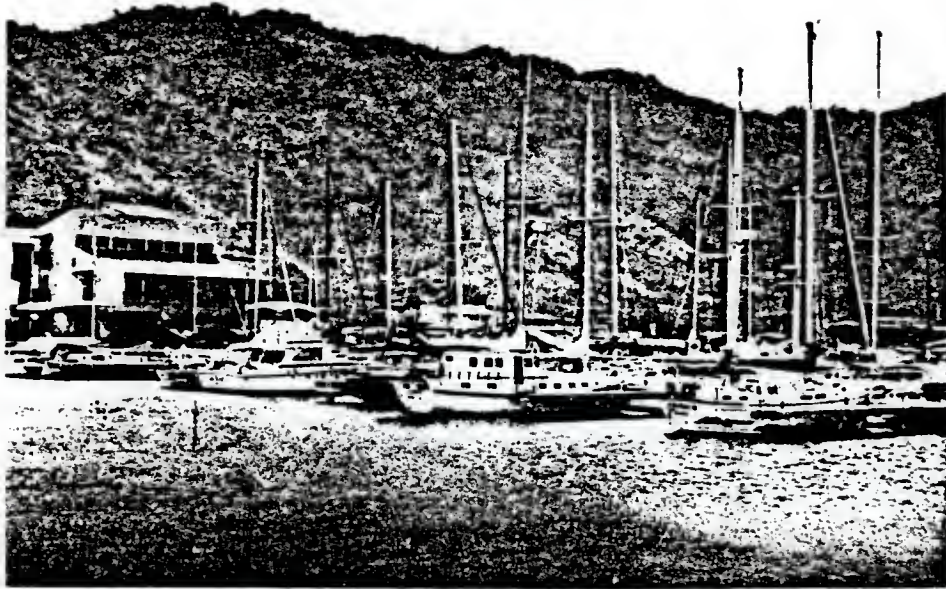


Figure 51: Marina Activities, Wickhams Cay. Charter boat berths now accommodate more overnight tourists than Tortola's hotels.



Figure 52: Smith Gore Building. Overlooking Wickhams Cay I, this building was singled out in the Shankland Cox Report as being one of the few structures worthy of retention along Main Street.



Figure 53: Main Street, Road Town, Facing West.



Figure 54: Main Street, Road Town, Facing East.

It is quite probable that few people in the British Virgin Islands would argue with the general tenor of the "tourist development strategy" as outlined in the Report. Such a strategy would help ensure the preservation of the existing unspoiled character of the Islands, while at the same time allowing some economic benefit to accrue from the tourist sector.

The presentation and testing of the alternative rates of development, however, are partially misleading. One of the constraints and/or opportunities used in gauging the suitability of each alternative was the continued viability of the construction industry. The year taken as the base for analysis of future activity of this sector was 1970. The Report failed to mention, however, that that year experienced what one author has described as an "abnormal building boom" (Bryden, 1973, p. 17), when an estimated 1,361 people were employed in this sector (Elkan and Morley, 1971, p. 8). At the time, this latter figure represented 36 percent of the then total labor force in the Territory, and was approximately equal to the sum total of those employed by the next three largest sectors -- government (15 percent of the total labor force), hotels, bars and restaurants (13 percent) and distribution (9 percent; Elkan and Morley, 1971). According to the Report's own estimates (1972, p. 167), employment in the construction sector was about halved (to 700 workers) by the very next year. The use of 1970 as a basis for predicting the role of the sector over a fifteen-year period, therefore, tended to overstate the normal, historic activity of this sector.

Another related point is that the construction labor force in 1970 comprised 45 percent non-belonger workers (Elkan and Morley, 1971; existing legislation at the time required a minimum 60 percent belonger ratio). The Report stated in another of its four "critical"

considerations that any rate of growth requiring excessive reliance on immigration should be avoided (1972, p. 50). A continuation of construction activity on the 1970 level, however, would necessitate a continued reliance upon such a source of labor.

Each of the three alternative rates of growth were analyzed fairly comprehensively in the Report (1972, pp. 175-177) with relation to resulting government revenue. However, no estimate was made of potential government costs generated, since it considered that demand on the engineering infrastructure was not a "critical constraint," but that such demand would, in fact, lead to greater economies of scale. Whether or not this would be the case, the findings of Bryden should be borne in mind:

. . . previous estimates of the cost of infrastructure and utilities may have been seriously underestimated in the context of the Caribbean. In fact, taking incentives to developers and infrastructure together, it would not be unduly misleading. . . to suggest that governments have had to match the contribution of private investors almost 'dollar for dollar' in monetary terms. (1973, p. 146)

Moreover, although the provision of additional infrastructure was considered in the Report to be "a critical constraint at some point" (1972, p. 50), again no analysis of potential public costs were made, even though the preferred rate of growth would necessarily impose a severe burden on health and education services, as discussed later in this section.

The rejection of the alternative "market rate of growth" scenario in the Report was correct, in the opinion of the author, because of the undue strain it would have placed upon both the economy and society. However, the "labor constrained rate of growth," which was dismissed with equal brevity, may have warranted slightly more attention. Briefly, this latter alternative assumed no further immigration over that which had

already occurred in 1970. The argument stated in the Report was that further immigration was inevitable because of needed skills, and would result in a concomitant and equivalent increase in unemployment amongst the belonger labor force.

The above argument perhaps may be slightly too simplistic, since it ignores the traditional and continuing out-migration of British Virgin Islanders to the neighboring American islands, primarily because of higher wages. Even in 1970, when unemployment was "negligible" and a large immigration of 'downislanders' was occurring in the Territory, there still remained at least 1,200 British Virgin Islanders in St. Thomas (Elkan and Morley, 1971, p. 13). This traditional outward movement, therefore, would probably negate unemployment caused by a small inflow of foreign workers, even if the United States immigration laws became further restrictive.

The rejection of the lower growth rate on the grounds that "the demands on the building industry for visitor accommodation would be little more than those for 1970" (1972, p. 58) is misleading for the previously stated reason that the latter year experienced abnormal construction activity. Even if "expansion of the industry would be severely restricted," the Report's own findings estimated that visitor beds would more than triple over the fifteen-year period -- from 735 in 1971 to 2,300 in 1986 (1972, p. 56).

Another argument proposed against the lower rate of growth in the Report was that insufficient use would be made of infrastructural investment: "[T]he airport would, for example, only be operating at about 25 percent of its potential capacity" (1972, p. 58). These estimates were based on a "blanket" assumption that 50 percent of all future tourists would demand overnight accommodation in either hotels,

apartments or residential resort housing. Should visitor bed construction be curtailed to avoid excessive immigration, however, it does not necessarily follow that the number of charter boat and day visitors would be restricted correspondingly, and who would also utilize much of the Territory's infrastructure such as the airport and roads.

The fairly arbitrary selection of 3,500 visitor beds for the preferred growth alternative, as well as the assumptions leading to the choice of that alternative, are also subject to question. Restricting the additional immigration population to below 50 percent of the total population, the Report contended, would not "overwhelm the local population" (1972, p. 58). It should be borne in mind, however, that immigration to the Territory for the purpose of employment is a relatively recent phenomenon that only began to occur in the late 1960's (Elkan and Morley, 1971). Even if restricted below the "magic" 50 percent level, such immigration could well cause abrupt cultural and social disruption and resulting belonger resentment.

The actual selection of the number of beds under the preferred alternative would appear to be heavily influenced by the stance that any growth that would result in construction activity less than that occurring in 1970 should be discounted. As mentioned previously, this was not a particularly appropriate year upon which to base future activity upon.³

The argument that the rate of growth "in the early years should more closely approach market and development pressures to allow time for the setting up of control machinery" (1972, p. 59) is a somewhat risky proposition. This strategy could lead conceivably to such uncontrolled initial development as to make any cohesive and comprehensive long-term planning exceedingly difficult.

According to the Report's own estimates, the number of immigrants required under the preferred growth scenario would represent approximately 30 percent of the Territory's total labor force and; together with their dependents, about 34 percent of the total population. The demands placed by this population upon housing requirements would be more than twice as much as that evolving from natural population growth: whereas an additional 861 housing units would be required for the belonger population, some 1,935 units would be required by the additional immigrant population (1972, p. 60). With regard to educational requirements, whereas some additional 500 school places would be needed by 1986 because of the natural increase in the local population, the corresponding number for immigrant children would be over 800 places. The Report made no attempt to quantify the additional public costs accruing, however.

Again, according to the Report's estimates, the natural population growth was anticipated to increase at a moderate rate of 2.0 percent annually during the period 1971 to 1986 -- from 10,200 to 13,260, respectively. Under the preferred alternative, population growth would more than double, with an extremely high rate of 4.9 percent being attained. This increase can hardly be called "a slightly higher rate of population growth" (1972, p. 59).

Although the findings of the preferred rate of growth for the Territory were used as a basis for analyzing the potential development on Wickhams Cay, no attempt was made -- at least, in the Report -- to distribute the number of visitor beds and tourists according to individual island. It may be suggested that the impact of development proposals for Wickhams Cay upon Tortola cannot be evaluated to any extent without first hypothesizing the total number of tourists that would be expected to stay on the island under the preferred rate of

growth alternative. Those tourist staying in Virgin Gorda, for example, would not particularly have any impact on the engineering infrastructure or environment of Tortola, and vice versa. Also, the location of visitor accommodation would directly affect the demand by employees and their families upon housing, education and other social services within a particular island. The Report thus failed to address the relationship between the Territory and Tortola, and that between Tortola and Wickhams Cay.

Utilizing the Report's own estimates for the average length of stay and occupancy characteristics for 1985, the number of visitors annually with the maximum development of two 200-bed hotels on Wickhams Cay would be 10,950, and with the visitor apartments another 6,862 (assuming an average of two beds per apartment). In addition, the provision of 300 berths at the marina could possibly provide accommodation for 7,270 visitors annually (assuming occupancy characteristics and average length of stay for charter boats in 1974; Evans, 1975c, p. 8). The total number of overnight visitors associated with only the proposed developments on Wickhams Cay would thus approximate 25,000 annually. In order to assess the total impact on Road Town, other existing hotels in the environs (such as "Prospect Reef" and "Treasure Isle"), in addition to existing marinas in the area ("The Moorings," "Caribbean Service Yachts"), need to be included in the analysis. If they are, it is fairly safe to predict that the number of overnight tourists in the Road Town area alone may approach 50,000 by 1986, which may be compared to the total number of 28,109 tourists who stayed in either hotels or on charter boats in the whole Territory in 1974 (Evans, 1975c, p. 8). It should be emphasized, however, that "Prospect Reef" came into operation subsequent to the

Report's findings, and that "Caribbean Service Yachts" was not based in Road Harbor in 1972.

The author's conclusion is that although the strategy for development as outlined in the Report has obvious wisdom, it may be doubted whether the realization of that strategy would be achieved under the preferred rate of growth scenario. Indeed, some of the recommendations in the Report would almost suggest -- however erroneously -- that the development plans for Wickhams Cay were conceived first, and then placed within a preferred rate of growth for the Territory as a whole. To do justice to the Report, the latter stated more than once that a detailed analysis of tourism potential for the Territory was not within its terms of reference. Many of its assumptions and propositions have, however, been adopted within the official development policy for the Territory.

Since no distribution of hotel and resort housing development according to island was attempted in the Report, it is difficult to compare its results with those of the OASYS program. By 1974, the estimated number of hotel and guest-house beds in the Territory was approximately 730, as compared to a corresponding number of 567 in December, 1971 (Shankland Cox's estimate). Thus, the remaining number to be built under the Report's preferred growth rate was 1,195. The OASYS composite maps suggest that the Tortolian, high school and continental expatriate respondents desired the additional construction of 420, 790 and 360 hotel beds, respectively. Assuming that the Report anticipated most of its preferred development to occur in Tortola, its findings are fairly comparable with those derived for the high school sub-group, but probably higher than those for the Tortolian and expatriate groups.

With regard specifically to the two large hotels planned for Wickhams Cay, the composite map for the visitors did show that hotel

development would be one of the most appropriate land-uses for large areas of Road Town, although no high rating was given. Of all the groups sampled in 1974 and 1975, however, it was the visitors who were most opposed to the development of large hotels. If the two hotels as planned were constructed on Wickhams Cay, therefore, it may be inferred that they would be catering to a decidedly different clientele than that visiting the Islands during the survey period. Of the three permanent resident samples, only the high school sub-group favored large hotel development.

The greatest difference between the Report's and the OASYS findings lies in the types of other visitor accommodation to be provided. According to the Report (1972, p. 40), the mix of visitor accommodation in December, 1971, was 77 percent in hotels and guest-houses, 19 percent in apartments and 4 percent in cottages and villas. The Report assumed that the future mix of accommodation, however, would be 55 percent, 35 percent and 10 percent, respectively. Hence, by 1986, in addition to the 1,925 beds in hotels, there would also be 1,225 provided by apartments and 350 by villas.

The definition of "visitor apartment" is ambiguous in terms of ownership, since it may either be owned by resident businesses and individuals and sub-let or rented to visitors, or it may visitor owned and used. The findings of the public survey showed that the great majority of all group samples disliked the idea of visitor-owned, or condominium, development. The results of the OASYS program reflected their disapproval, suggesting that a maximum of only 80 beds -- for the high school students -- be allotted to this type of accommodation. By comparison, the Report envisaged a total number of 1,575 beds in apartments and villas within the Territory by 1986, of which it can only

be assumed that some proportion (certainly greater than 80 beds) would be visitor-owned and located in Tortola.

It is interesting to note that the "labor-constrained" rate of growth rejected in the Report more closely resembled the OASYS results. The provision of an additional 535 hotel beds would agree with the findings for the Tortolian and continental expatriate groups if the majority of these beds were built on Tortola, although even the total number under this scenario would be too small to please the high school respondents.

The only group sample that would be discontented with any or all of the Report's three alternative growth rates would, of course, be those visitors polled in 1974 and 1975, who in general desired no further development. Whether this merely was wishful thinking on their behalf and they would return for another vacation even if more development occurred, or whether some would instead turn to more remote islands, is a matter for conjecture. Should substantial development occur on Tortola -- and perhaps a sufficiently substantial amount already has occurred -- then a different tourist market other than that catering to the vacationer who can afford luxurious tranquility would need to be found.

The Draft Territorial Plan

Presented as a policy guide to the British Virgin Islands Government by a United Nations appointed planning expert, the Draft Territorial Plan (Anderson, 1973) represented a more thorough spatial analysis of the Territory's development capabilities than that contained in the Shankland Cox Report. The latter's strategy for growth, however, together with its preferred rate of growth of 3,500 visitor beds by 1986, was used as the Plan's basic premise for development.

As in the Shankland Cox Report, no attempt was made to delimit the growth of additional visitor beds according to individual island. The Plan did, however, thoroughly examine the Territory's existing infrastructure and facilities, as well as delineating actual sites considered the most appropriate for future tourism development. In sum, the Plan provided a much needed, comprehensive planning strategy in order to assess individual proposed projects.

The selection of prime development sites was undertaken by use of a matrix, which was composed of potential development sites down the vertical axis, and an array of factors to be considered along the horizontal axis. These included whether a particular site had motorable access by road, access from the sea, allowed adequate mooring facilities and safe anchorage, whether it had a nearby reef, a sandy beach permitting safe swimming, provided adequate building land (which was defined as "physically capable of being developed at moderate cost;" Anderson, 1973), and whether it was compatible with other existing land-uses. As a result of this analysis, a total of 19 coastal sites in Tortola and Beef Island were determined suitable for development. In addition, six inland or "high ground" sites were listed. It should be noted that the Plan did not necessarily advocate that all of these sites should be developed, but merely stated that they were capable of supporting certain tourism facilities.

In comparing the total of twelve sites delineated by the OASYS program for tourism development, all but four were chosen in the Draft Territorial Plan, as shown in Figure 55. One exception was Lower Belmont Bay, which would seem to meet most of the Plan's prerequisites but does already harbor one medium-sized visitor facility ("Smuggler's Cove"). Two other sites (Little Carrot and Great Carrot Bays) have small, local

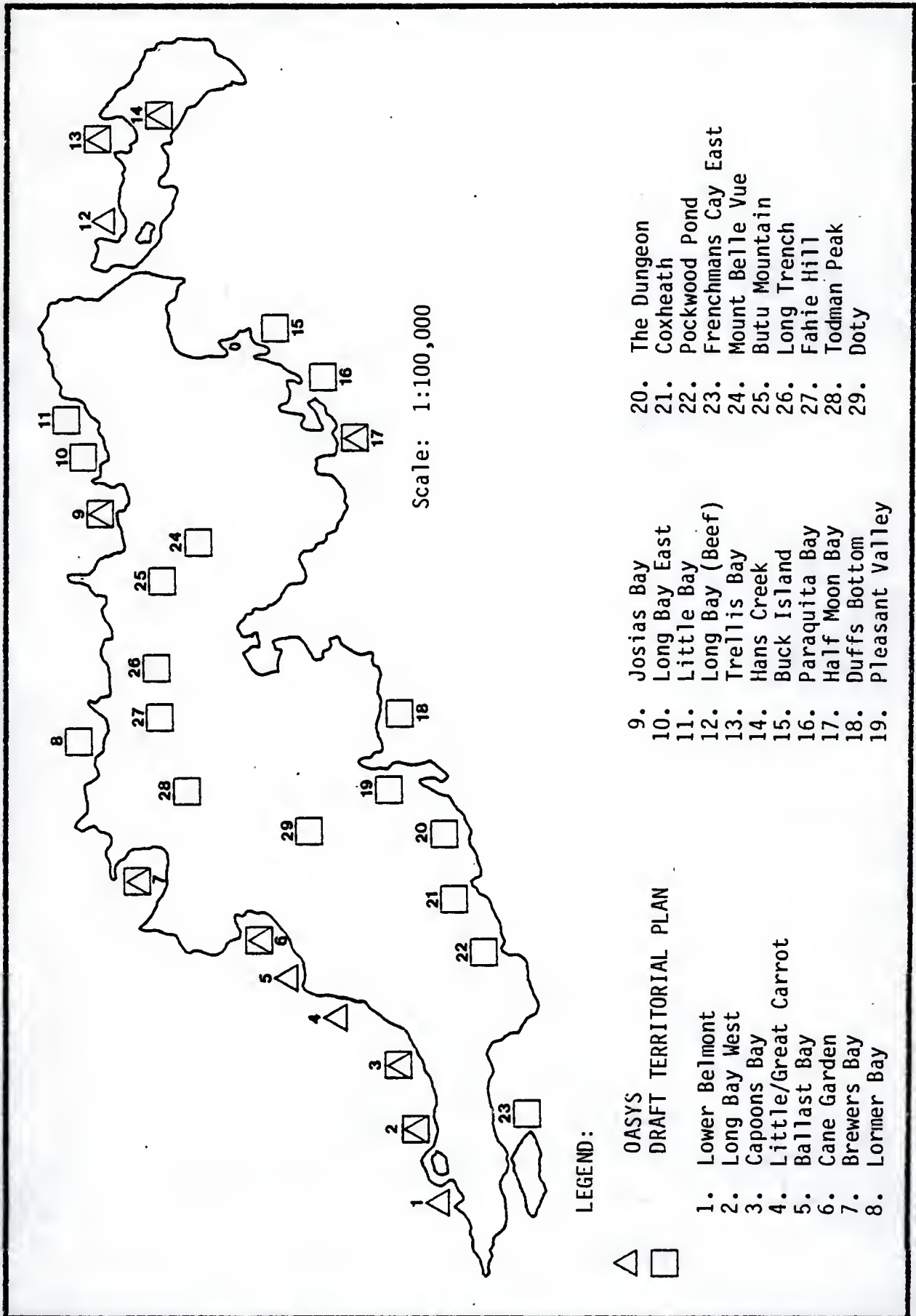


Figure 55: Areas Suitable for Tourism Development; Draft Territorial Plan and OASYS Program Results

villages, although sufficient space does exist in both instances for the development of a guest-house or medium-sized hotel. The fourth northern coastal site not mentioned in the Plan is at Long Bay, Beef Island, which is primarily utilized by Tortolians.

Of the three sites delineated in the Plan but absent from the OASYS composite maps, none have existing access by road. This finding would tend to reinforce the accepted development strategy outlined in the Shankland Cox Report -- that certain of the more remote bays should not be developed at all and remain accessible only from the sea. None of the Plan's six inland sites were demarcated on the OASYS maps, primarily because the latter's weightings tended to heavily favor those sites which were in a coastal location and having ready access to a good beach.

The remaining eight sites approved by the Plan but not by the OASYS maps are all located on the southern coast of Tortola, which the program results suggested was fairly unsuitable for further tourism development. In general, therefore, whereas the sites selected in the Draft Territorial Plan denoted emphasis for development along the more populated southern coastline, the results of the OASYS program suggested further development to occur at readily accessible sites along the northern coast.

The Draft Physical Development Plan

The results of Anderson's pioneering work in the Territory between 1969 and 1975 formed a basis for the British Virgin Islands Physical Development Plan, which was drafted in November, 1976, by the United Nations Development Programme (UNDP) Physical Planning Project Office. If approved by the British Virgin Islands' Government and the Office of Technical Cooperation of the United Nations, the report will become the

first officially sanctioned planning document for the Territory as a whole.⁴

In certain important respects, the findings of the Physical Development Plan differed from those of most previous studies. Its basic tenet was that the Wickhams Cay Land Reclamation Scheme would engage the Territory's economy extensively for the next decade (1976, p. 5). The strategy propounded for elsewhere in the Territory was thus one of rationalization and concentration of tourist facilities. In an environment which was considered by the Plan to be small and vulnerable, excessive tourism development inevitably would lead to a decline in the quality of tourism offered; therefore, the emphasis of the Government's policy and guidelines:

. . . will be on measures to secure and improve the qualitative offer the BVI can make in respect to tourism, rather than unreversible [sic] quantitative extensions. (1976, p. 51)

Future tourism development, according to the Plan, should be water-affiliated rather than land-based. The report suggested that land attractions were few by Caribbean standards, whereas the beach strands, underwater attractions and secluded anchorages "offer unique recreational opportunities in an unspoiled natural environment" (1976, p. 26). The Plan stressed the importance and advantageous aspects of yacht chartering. First, with the exception of shore facilities, the industry did not consume large quantities of land. Secondly, with such exceptions as careless anchoring, waste discharge and irresponsible spear fishing, it caused no particular damage to the environment. Lastly, the industry required relatively small investment in tourism infrastructure. In general, therefore, yacht chartering activities were ideal for the Territory:

At locations where land attractions are scarce or can only be developed at great expense, as in the B.V.I., boat chartering offers a good tourism development alternative. By capitalizing on sea attractions and minimizing on land infrastructure and superstructure facilities, chartering offers bargain basement opportunities for tourism development. (1976, p. 26)

With regard to land-based tourism, the Plan recommended that no further expansion be allowed until the already committed projects and plans for hotels, resort residential housing and marinas were fulfilled.⁵ No further sub-divisions for resort residential development (which already amounted to a potential 1,500 acres, with plans for 1,200 housing units; 1976, p. 33) would be approved until the actual execution or withdrawal of these projects occurred. Any future public investment in tourism would be restricted to those infrastructure projects which were multi-purpose in nature -- that is, designed to "improve the existing standard of technical and social services and facilities" (1976, p. 54).

Utilizing these general considerations for future development, the Plan then advocated certain guidelines which, although not comprehensive, it suggested should be adopted for future, detailed, area planning. These guidelines correspond surprisingly closely with the findings suggested by the OASYS composite maps.

Three "Action Areas," where carefully controlled tourism development would be allowed to occur in the future, were stipulated in the Plan with regard to Tortola: West End and the northwest coast extending to Cane Garden Bay, Brewers Bay, and Beef Island (1976, pp. III. 10-13). On the OASYS composite maps, these areas accounted for 10 of the total 12 delineated hotel development sites.

In contrast to the "Action Areas," the Plan delineated two major "Control Areas," both located on the south coast, where "control of the fragile natural environment is essential" (1976, p. 33). In these areas,

resort residential development (including that already planned) would be allowed only under certain restrictions. The two "Control Areas," extending from Fish Bay to Hodge Estate in the east, and from Sea Cows Bay to Fort Recovery in the west, account for over two-thirds of Tortola's southern coastline. In comparing these recommendations with the OASYS composite maps, it is interesting to note that the latter delineated only one suitable hotel development area on the southern coast and which, in fact, was denied further consideration by the author since it already harbored an hotel.

Finally, the Physical Development Plan designated two "Master Plan Areas", which encompass the major urban settlements of Road Town and East End/Long Look (1976, p. III.2). In both areas, further tourism development would not be encouraged (other than that which is occurring presently), although the need for public recreation areas was stressed. Once again, these findings closely reflected those of the OASYS composite maps, which gave no high score to hotels and resort residential housing in major urban areas. In addition, although they did not receive a significantly high rating ('7' or above), several cell blocks in the Tortolian, high school student and continental expatriate maps were delineated as best suited for developed recreation in these two urban areas.

The only apparent anomaly between the result of the Physical Development Plan and the OASYS program was the Josias Bay area, which was highly favored by the latter for hotel development. Its absence for consideration in the Plan, however, merely emphasizes the policy advocated by the UNDP Physical Planning Project Office of consolidation and concentration of further tourism development, and does not imply that Josias Bay is intrinsically unsuitable for tourism development.

The Lascelles Report

A few months prior to the drafting of the Physical Development Plan, another study relating to tourism was undertaken at the behest of Great Britain's Ministry of Overseas Development (Lascelles, 1976). Its recommendations so closely reflect those of the Plan as to suggest that the latter may possibly have incorporated some of Lascelles' conclusions, although no specific reference was made to his report.

In the opinion of Lascelles, the Territory had fared much better than many Caribbean islands with regard to tourism, since the absence of a jet airport and any serious unemployment had allowed the Government to resist the pressures for development without due regard to the consequences. He suggested, however, that:

. . . the experience of Wickams Cay should be sufficient reminder of the need for Government to have a clear idea of what it wants and how to achieve it. (1976, p. 12)

Unfortunately, Lascelles found little evidence during his visit to the Territory that the Government had yet developed the appropriate machinery to cope with the complexities of the tourism industry (1976, p. 28).

The primary aim in any planning and policy dealing with tourism, according to Lascelles, was to:

. . . induce investment in those projects which will produce the best long-term mix of amenities in relation to future potential demand and which will make the best use of available resources (land, capital and manpower) to produce the optimum socioeconomic benefits to the community. (1976, p. 14)

Within the British Virgin Islands, the type of tourism which should be developed would be one that would ensure a comparative advantage over other tourist resorts within the Caribbean, and that would improve the general quality of life for the local population. In respect to the latter goal, increased participation by belongers in the ownership and management of visitor-related industries and services should be

encouraged. Lastly, only those types of tourism that preserve and protect the attractions of the Territory should be permitted (1976, p. 17).

With particular regard to hotel development, Lascelles strongly suggested that the Government should have a clear conception of "where it would like to see development taking place and in what form and size" (1976, p. 20). Although luxury hotels might be important in establishing a country in the world tourist market initially, Lascelles stated that there was also a need for the medium-quality hotel that attracted the type of tourist who could now afford to travel abroad under the auspices of group tours and other arrangements. Irrespective of the type of clientele, he advocated that all hotels should be small-scale in development, and that no facilities any larger than 'Prospect Reef' should be considered for the foreseeable future. By limiting the size of hotels, he argued, the Islands could retain their informal and friendly atmosphere, semi-monopolies could be avoided, and staff training could be more personal (1976, p. 22).

As far as other forms of accommodation were concerned, Lascelles suggested that guest-houses, fishing lodges and efficiency units should all be encouraged "at the right time." Holiday villas, apartments or single short-term lettings in private houses, however, would need to be further studied to assess their effect on regular hotel business:

The practice of selling off a holiday villa or apartment to an absentee owner who uses the accommodation for a fortnight or so a year and lets it off for other periods not only brings little into the economy but in some parts of the world has driven the 'legitimate' hotel business almost into bankruptcy. (1976, p. 22)

Noting that the charter boat industry has grown by leaps and bounds, Lascelles advised the Government to determine a point in time when any further expansion would create overcrowding of anchorage but bring little net gain to the economy.

In connection with all types of tourist facility expansion, Lascelles considered that further tax and import duty concessions were unnecessary, since tourism was no longer a pioneer industry. He contended that the major enticement that could be given to serious investors would be the formulation of a comprehensive and publicly accepted policy regarding the future growth of tourism (1976, p. 14).

Lascelles' conclusions were that additional hotel construction in the short term should be "on a very modest scale indeed" (1976, p. 25). Such restraint would allow the Government a breathing space to agree upon a strategy for the orderly development of tourism. The uncertainties associated with the industry in the Caribbean as a whole should in any event warrant caution:

The emphasis should . . . be on making the existing tourism industry work better rather than proceeding with development for its own sake, without due regard to the social, economic and political problems that could come about by creating an oversupply of hotel rooms and a lowering of occupancy rates. This could, as has happened elsewhere, pressurize the Government into subordinating its long-term aspirations to short-term and hasty actions. (1976, p. 28)

By strengthening the economic viability of existing operations, the industry would encourage increased participation by local investors, thus consolidating the position of tourism within the economy for its future well-being.

Since Lascelles made no attempt to quantify the preferred future number of tourists or to specify specific locations for development, it is impossible to compare his conclusions directly with those of the OASYS program. His emphasis on the small-scale development of future hotels, however, did coincide with the desires of at least the visitor and continental expatriate respondents, and his hesitancy over the development of visitor-owned accommodations somewhat reflected the

general animosity displayed by all culture group samples. Lastly, Lascelles' emphasis on a slower rate of growth in the future would tend to support the author's findings as well as those of the UNDP Physical Planning Project Office, and possibly relegate the Shankland Cox preferred growth estimate to one of a bygone era.

Notes

1. Kingsbury quotes an Editorial in the Tortola Times, dated May 28, 1960, p. 3.
2. The United Nations' Development Programme's report (1976, p. II.26) estimated that at the time of writing there existed 1,200 beds in "commercial overnight accommodations" in the Territory. These would include, however, self-sufficient units as well as rented private homes.
3. The increase in the number of hotel beds alone (1,925) would be equivalent to fourteen "Little Dix Bay" hotels. For the purpose of comparison, even St. Thomas and St. Croix between them had only twelve hotels with over 130 beds at the time of the Report's findings (1972). It is realized, of course, that not all hotel beds in reality would be provided solely by large hotels, however.
4. As of March, 1978, the Physical Development Plan had still not received official approval from either the Government or the United Nations' Office of Technical Cooperation. The Road Town Master Plan (Anderson, 1975), however, which was utilized in the Physical Development Plan, has been officially approved for development planning, and as such represents the first such sanctioned document to have emanated from the UNDP Physical Planning Project Office in the Caribbean.
5. As of March, 1978, to the author's knowledge, most of the proposed hotel and marina developments had or were being undertaken (these include "Prospect Reef" and the new Road Harbour sites of the "Moorings" and "Caribbean Service Yachts"), with the exception of a hotel facility slated for Trellis Bay, Beef Island. However, several sub-division proposals for resort residential housing, including one that would substantially alter the character of Beef Island, were still pending.

CHAPTER VII CONCLUSIONS

It is self-evident to suggest that the development of a country is reliant at least partially upon the mix of resources it has at its disposal. Equally as important, however, are the political, social and cultural values that characterize an economy as well as governmental policy regarding future development nodes. Uses and abuses of resources accordingly will vary in relation to a country's specific requirements and aspirations.

In the British Virgin Islands, it is the present government's policy to utilize tourism as the major sector for general economic advancement, to be supported by the more traditional agricultural and fishing industries. Endemic to each of these sectors, however, lies the seed of disruption for its fellow sectors. A massive revival of agriculture, for example -- however improbable -- may make drastic inroads into areas of natural vegetation, which may be so cherished by tourists. The encouragement of hotels and other visitor facilities may not only deny the agricultural and fishing sectors of their labor force, but also occupy otherwise good farming land. These considerations point most obviously to the need for a balanced, realistic and integrated development of resources, denying the absolute hegemony of any particular sector.

Good management policy essentially entails the maximization of a resource use and the minimization of its abuse. In this context, abuse covers the wastage or underemployment of a resource, as well as its

overutilization, leading to the deleterious effects of air, water and land pollution -- and even society, in the form of overcrowding and alienation. In small islands such as Tortola, where resources most commonly are severely limited, use/abuse problems must necessarily be considered carefully.

The management of tourism within the Territory so far has been remarkably successful, especially in comparison with most of the other islands in the Caribbean. O'Shaughnessy observed:

The British Virgin Islanders have done the impossible. They have stayed a happy, friendly, welcoming, colour-blind people in the maelstrom of change and progress of the modern Caribbean. They have developed rapidly, but never at the cost of selling their own souls. They have told developers "this is the way we would like things done", and the developers have either complied or got out. (1971, p. 26)

Judging from the survey returns, visitors are generally pleased with the limited tourism development that has occurred, which has allowed the natural beauty and facilities of the island to be enjoyed in an unsullied atmosphere.

It is to be hoped, however, that such success will not lead to a sense of future complacency. There is a critical need for the British Virgin Islands' Government to formulate a more comprehensive policy addressing where exactly additional tourism facilities would be permitted and what type would be most acceptable. The drafting of, and access to, such a manifesto has obvious merit; as Lascelles remarked:

Some of the schemes that have been proposed by developers for Anegada have wasted a good deal of Government time and effort which could have been averted if a clear statement of policy regarding development of the islands were available. (1976, p. 16)

Equally important is the need for Government to determine the overall limits to growth that would be permitted. Such a carrying capacity, or saturation point, could be delineated by the number of beds/berths per

thousand residents, as in the Seychelles, or some desirable ratio of the number of visitors to indigenes.

Results of the OASYS program indicate that whatever growth cap was finally adopted, it would not please all segments of the population, as might be expected. A gradual and moderate growth in hotel facilities, to eventually provide accommodation for 60 percent more hotel guests than in 1976, would appear to meet the approval of the majority of Tortolian and continental expatriate respondents. The alternative suggested by the visitor respondents (that of no additional growth) probably would prove both politically and economically unacceptable, while that suggested by the sub-sample of the high school students (more than a twofold increase in hotel accommodation) could prove to be socially unacceptable.

The desires of the high school students for large-scale hotels and general tourism development may be interpreted in three different ways. First, they may represent merely the common youthful articulation of change for its own sake -- an assertion of independence from an older generation -- and may thus be discounted. The other two interpretations have more important implications with regard to the Government's stated policy of controlled and gradual growth. A new generation of leaders possibly may consider that growth more closely aligned to that experienced in the neighboring U.S. Virgin Islands may be more beneficial to its own well-being and that of the Territory. Lastly, the younger generation may be dissatisfied with the opportunities of employment and promotion within the existing tourism industry in Tortola.

Expatriates do indeed control the large majority of middle and upper level management positions (as mentioned previously in Chapter IV), which is not particularly surprising in light of foreign ownership of almost all of the tourism facilities. An alternative and complementary

development that would increase the participation of local residents in the management of the industry, however, was firmly endorsed by visitor respondents -- namely, the provision of locally-owned guest-houses. If the apparent disinclination exhibited by Tortolians toward this type of facility could be overcome, and if adequate guidance could be given to ensure the viability of such facilities (for example, a school curriculum that would provide the necessary skills, as well as active participation by such organizations as the Small Hotel Advisory Committee of the Caribbean Tourist Organization), then such a development could offer substantial benefit to the Territory. Not only would the economic returns from tourism be enhanced, not only would future resentment toward tourism by the local population be minimized, but the "visitor" industry would be converted into a "people" industry, as ideally it should be. Once the younger generation perceive that tourism could offer a more dignified advancement in society, then future outmigration of some of the potentially most beneficial citizens could be curbed.

With regard specifically to the OASYS model, it is comforting to the author to note that its results coincided surprisingly closely with those of the most recent studies by Lascelles (1976) and the United Nations' Physical Planning Project Office (1976). Providing that these reports were at least partially indicative of the consensus of opinion that existed at the time of their drafting¹, it would appear that the method is a useful tool of analysis for planning purposes, in that it crystallizes public opinion, as well as offering some quantitative capability. Although input to the model was derived up to two years prior to the undertaking of the two latest reports, no predictive capability is hypothesized. Rather, it is more probable that the preferred approach to the future development of tourism was inherent in

peoples' perceptions, but had not been previously articulated in a comprehensive planning approach.

The results of the sample surveys strongly and justifiably indicate that the Tortolian is proud of his island. For the sake of the well-being of future generations, it is sincerely hoped that the principle of the Community Development Theme Song is adhered to:

God made the Virgin Islands
Set them 'mid shimmering sea,
Crowned them with matchless beauty,
A charge for you and me.

A voice in years that followed
Rings out in accents clear,
A warning and a challenge
For everyone to hear.

We have a task before us
To make these islands shine
To build and beautify them-
This land that's yours and mine.

This land is our land
Your land and my land
From Anegada from Jost Van Dyke land,
If we love our country
Let our watchword always be
'This land belongs to you and me'.²

Notes

1. The introduction to the UNDP Physical Planning Project's report on the Virgin Islands states that it was prepared in close consultation with the Government and "represents by and large their intent." By implication, therefore, the findings must at least partially indicate the opinions of the citizenry.
2. Quoted in Harrigan (1968, p. 33).

APPENDIX I
DISTRIBUTION POINTS FOR PUBLIC SURVEY QUESTIONNAIRE

<u>Name</u>	<u>Type of Establishment</u>
Administration Building	Government offices
Agricultural Department	" "
Cable and Wireless	Communications
Caribbean Service Yachts	Charter boat company
Cell 5	Restaurant/bar
Cossy Inn	Restaurant/bar
Electricity Department	Government office
Fleet Indigo	Charter boat company
Fort Burt	Hotel
Harbor Lights	Restaurant/bar
Peebles Hospital	Major medical center
Kaytering Bar	Restaurant
Little Denmark	Shop/coffee house
Long Bay	Hotel
Moorings	Charter boat company
Penns	Restaurant
Police Station, Road Town	
Public library	
Public Works Department	Government office
Quiet Quaker	Restaurant/bar
Scatliffe's	Restaurant
Sea View	Guest-house
Sebastians	Hotel

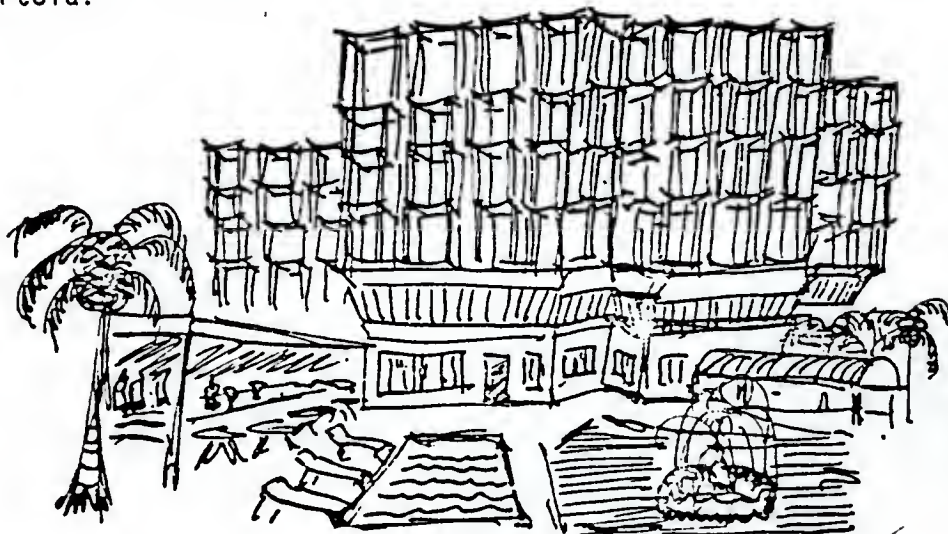
<u>Name</u>	<u>Type of Establishment</u>
Sir Francis Drake Pub	Restaurant/bar
Smugglers Cove	Guest-house/bar
Sports Club	Private sports facilities
Stonehaven	Restaurant/bar
Sugar Mill	Hotel
Tourist Board	Quasi-government office
Treasure Isle	Hotel
Survey Department	
Town Planner's Office	
High School	

APPENDIX II
PUBLIC SURVEY QUESTIONNAIRE

This questionnaire is not official, but is designed to help gather some needed information for my graduate research. The final results will be made available to the B.V.I. Government. I would greatly appreciate your helping me.

The idea of this questionnaire is to find out how you, either as a resident or visitor, would like to see Tortola developed for the future. The results could be very worthwhile for Tortola. And you will have made your opinion known. It takes about ten minutes.

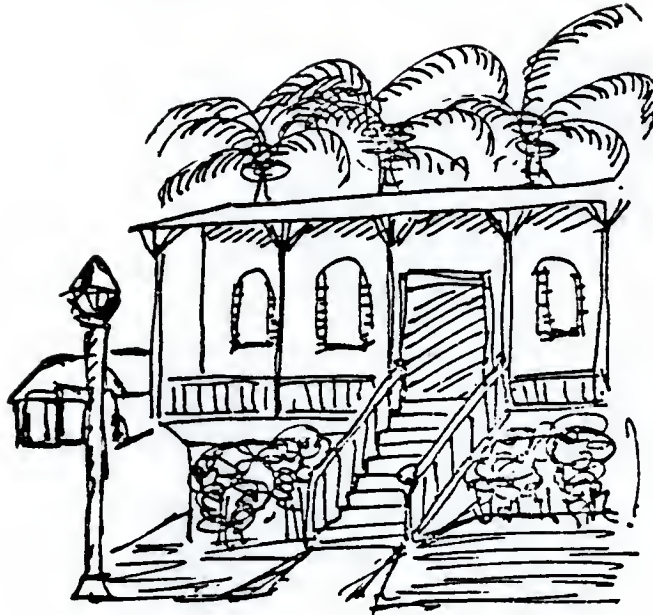
1. What type of tourist accommodation would you prefer to see in Tortola?



- A. Large hotel: 100 or more beds, swimming pool, outdoor bar, golf course, beach location, night shows, American-style food and living accommodations.



- B. Medium-sized hotel: about 20 to 50 beds, swimming pool, near beach, serving mostly American-style food.



C. Small hotel or guest-house: about 5 to 15 beds, comfortable but simple accommodations, locally owned, and serving local foods as a specialty of the house.

D. (not shown) Visitor-owned apartments (condominiums).

Please list your choice in order of preference:

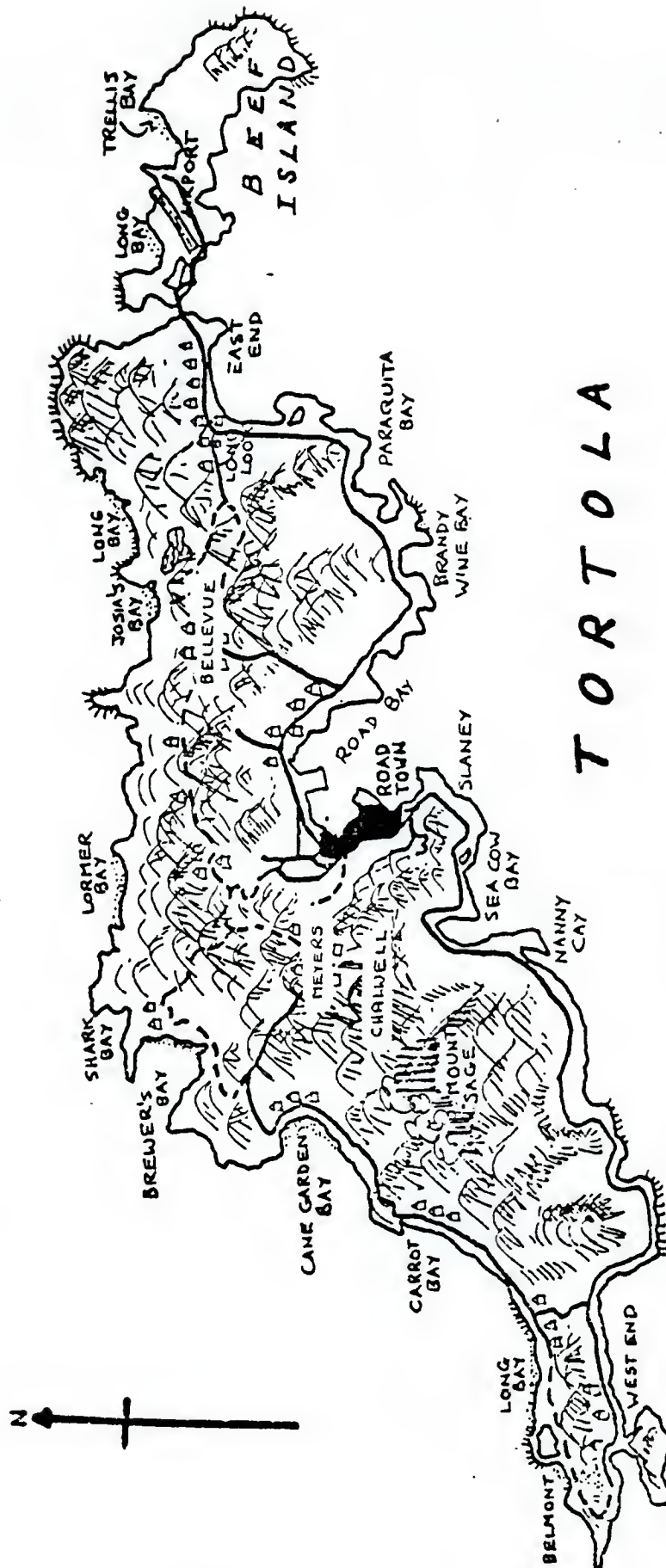
1. ____ 2. ____ 3. ____ 4. ____

2. Ideally, in the future, would you like to see (check one):

far more tourists than now? _____
 more tourists than now? _____
 about the same as now? _____
 fewer tourists than now? _____
 far fewer tourists than now? _____

3. Below is a sketch-map of Tortola. If you can, please mark on the map:

- those areas which you find especially beautiful (circle with a solid line)
- those areas, if any, which you find ugly (circle with a dashed line)
- those areas which you would like to see developed, or further developed, for tourism in the future (please shade)



4. What would you say is most important in attracting tourists to Tortola? Please list in order of importance:

natural beauty	_____	cultural and social interests	_____
climate	_____	sports (sailing, fishing, etc.)	_____
friendly atmosphere	_____	other (please list)	_____

5. Are you a resident or visitor? _____

If a resident, please say where you were born _____

6. The last question, which is not anything as complicated as it looks. Just give your own personal answers.

Suppose you were responsible for developing Tortola. You would consider that certain types of development were more important in some areas than others. On the next page is a chart, with types of areas listed across the top, and possible types of development listed down the side.

Give a score, ranging anywhere from 1 to 9, to show how important you think each type of possible development should be for each of the five types of areas. For example, if you give a score of 9 for agriculture in 'coastal rocky areas', then you think that agriculture is essential in that type of area. If you give a score of 1, you don't think it should be important at all in coastal rocky areas. A score of 5 would mean that you think agriculture should be of average importance in that type of area.

	Urban areas	Coastal rocky areas	Flat coastal areas	Inland slopes	Interior upland
Agriculture					
Natural vegetation					
Schools, hospitals, libraries, etc.					
Residential housing					
Commerce					
Resort, housing hotels, apts., etc.					
Developed recreational areas					
Industry					

That's it. Many thanks for answering the questions. I only hope you found them interesting to answer.

Christopher Howell

APPENDIX III
EXPERTS' QUESTIONNAIRE RESPONDENTS

1. Agricultural Questionnaire

<u>Name</u>	<u>Occupation/Expertise</u>
Anderson, O.	Town Planner
Farrington, David	Horticulturist, Prospect Reef
Herbert, Merritt	Farmer
Hodge, O.	Agricultural Department
Creque, R.	Dept. of Natural Resources
Maduro, A.	Agricultural Department
O'Neal, J.R.	Businessman, chairman of Land Development Control Auth.
Smith, J.	Horticulturist, Treasure Isle Nurseries
Todman-Smith, E.	Dept. of Natural Resources
Vanterpool, N.	Chief Agricultural Officer

2. Commerce and Industry Questionnaire

<u>Name</u>	<u>Occupation/Expertise</u>
Anthony, B.	Store proprietor
Barton, N.	Registered accountant
De Freitas, R.	Supermarket manager
Donavon, M.	Bank manager
Georges, E.	Secretary to the Chief Minister
Herbert, M.	Store proprietor
O'Neal, J.R.	Businessman
O'Neal, M.	Businessman
Roy, Rowan	Store proprietor
Romney, C.	Publisher
Sears, C.	Manager, Wickhams Cay Development Authority
Shaw, A.	Architect
Todman, B.	Store proprietor
Williams, T.	Imports manager

3. Resort/Recreation Questionnaire

<u>Name</u>	<u>Occupation/Expertise</u>
Anderson, O.	Town Planner
Bouchard, H.	Architect
Cary, C.	Charter boat manager
Donavon, M.	Bank manager
Downing, R.	Architect
Geocento, J.	Hotel manager
Georges, E.	Secretary to the Chief Minister
Hulse, E.	Hotel manager/proprietor
Mack, T.	Hotel manager
Rivers, J.	Hotel manager
Romney, C.	Publisher
Rouchier, C.	Hotel manager
Sears, C.	Manager, Wickhams Cay Development Authority
Wallace, W.	Governor
O'Neal, J.R.	Businessman

APPENDIX IV
EXPERTS' QUESTIONNAIRE: AGRICULTURE

1. Below are listed 8 factors which in varying importance may affect the development and location of agriculture. For each factor, please give a score (ranging anywhere from 1 to 9) to indicate its importance with relation to the location of agriculture.

(A score of '1' would denote that the factor under consideration is of minimal importance; a score of '5' would denote that it is of average importance; and '9', that it is of maximum importance. Each score may be repeated as often as need be.)

a)	size of land property	<u>4</u>	Any other factors (please list and score) _____ _____ _____
b)	type of soil	<u>6</u>	
c)	water supply	<u>9</u>	
d)	slope	<u>6</u>	
e)	existing land values	<u>6</u>	
f)	accessibility to roads	<u>5</u>	
g)	proximity to urban areas	<u>3</u>	
h)	existing natural vegetation	<u>5</u>	

2. Again, please give a score (from 1 to 9) to show how important, or suited, you believe each of the types of land-use listed below is for each of the 7 types of areas.

	Tree crops	Vegetable crops	Improved pasture	Rough pasture	Indigenous woodland	Scrub
Ghuts	7	2	3	2	8	3
Valley bottoms	6	8	8	2	3	3
Residential areas	4	5	2	2	3	2
Coastal rocky areas	2	1	2	5	5	8
Flat coastal areas	4	6	6	4	3	3
Inland slopes	9	6	7	6	8	6
Interior upland	7	5	6	6	9	3

3. Some of the categories listed on the previous page have been subdivided below into categories. Using the 1-9 score range, could you please signify how each of the categories is suited for agriculture?

a) size of land property:

less than 1 acre	<u>8</u>
1 to 5 acres	<u>8</u>
6 to 9 acres	<u>7</u>
10 to 19 acres	<u>7</u>
20 to 49 acres	<u>5</u>
50 to 99 acres	<u>4</u>
100 acres or more	<u>4</u>

d) type of soil:

schist	<u>5</u>
dioritic	<u>4</u>
volcanic	<u>7</u>
limestone	<u>6</u>
alluvial	<u>8</u>

b) degree of slope:

0 to 12 degrees	<u>9</u>
13 to 22 degrees	<u>8</u>
23 to 30 degrees	<u>6</u>
31 to 45 degrees	<u>5</u>
more than 45 degrees	<u>5</u>

e) existing land values:

low	<u>8</u>
medium	<u>7</u>
high	<u>2</u>

c) accessibility to roads:

served by existing	
major road	<u>5</u>
secondary road	<u>7</u>
footpath	<u>6</u>

f) proximity to urban areas:

within 1 mile	<u>4</u>
within 2 to 5 miles	<u>6</u>
within 6 or more miles	<u>1</u>

4. For the different types of natural vegetation listed below, could you please give a 1-9 score to show their existing natural, or intrinsic, value, as well as listing any particular type of agriculture (if any) that you would prefer in such areas of vegetation?

Existing vegetationIntrinsic valueType of agriculture preferred

Mangrove
Scrub
Woodland
Forest

8
5
8
9

5. If you have any comments to make about this questionnaire, or about agriculture in general in Tortola, I would be very grateful if you could make them below and on the adjoining sheet. Many thanks for your cooperation.

Christopher Howell

Note: The scores indicated represent the average ratings derived from survey returns.

APPENDIX V
EXPERTS' QUESTIONNAIRE: COMMERCE AND LIGHT INDUSTRY

1. Below are listed 11 factors, which in varying importance may affect the location and development of commerce and light industry. For each of the factors, please give a score (ranging anywhere from 1 to 9) to indicate its importance with relation to, first, commerce, and secondly, light industry.

(A score of '1' would denote that the factor under consideration is of minimal importance; '5' would denote that it is of average importance; and '9', that is is of maximum importance. Each score may be repeated as often as need be.)

	<u>Commerce</u>	<u>Light Industry</u>
a) slope of land	<u>8</u>	<u>8</u>
b) water supply	<u>6</u>	<u>8</u>
c) number of individual plots within proposed area	<u>6</u>	<u>5</u>
d) existing land values	<u>7</u>	<u>8</u>
e) proximity to residential areas	<u>6</u>	<u>7</u>
f) proximity to existing commercial and/or light industrial areas	<u>7</u>	<u>7</u>
g) underlying geology	<u>4</u>	<u>4</u>
h) proximity to harbour facilities	<u>6</u>	<u>7</u>
i) proximity to existing roads and power lines	<u>8</u>	<u>8</u>
j) existing natural vegetation (to be removed)	<u>4</u>	<u>4</u>
k) existing aesthetic value of area	<u>4</u>	<u>4</u>
any other factors (please list and score)		
	<u> </u>	<u> </u>
	<u> </u>	<u> </u>
	<u> </u>	<u> </u>

2. Below, some of the factors listed on the previous page have been subdivided into categories. Could you please use the 1-9 scoring range to signify which of the categories are best suited for the development of commerce and light industry respectively?

a) <u>size of land property</u>	<u>Commerce</u>	<u>Light Industry</u>
less than 1 acre	<u>7</u>	<u>4</u>
1 to 5 acres	<u>7</u>	<u>6</u>
6 to 9 acres	<u>6</u>	<u>7</u>
10 to 19 acres	<u>4</u>	<u>7</u>
20 to 49 acres	<u>3</u>	<u>6</u>
50 to 99 acres	<u>2</u>	<u>4</u>
100 acres or more	<u>2</u>	<u>3</u>
b) <u>degrees of slope of the land</u>		
0 to 12	<u>9</u>	<u>9</u>
13 to 22	<u>5</u>	<u>4</u>
23 to 45	<u>2</u>	<u>3</u>
more than 45	<u>2</u>	<u>2</u>
c) <u>existing land values</u>		
low	<u>6</u>	<u>7</u>
medium	<u>7</u>	<u>7</u>
high	<u>7</u>	<u>4</u>
d) <u>proximity to residential areas</u>		
immediately adjacent	<u>6</u>	<u>3</u>
within 1 mile	<u>6</u>	<u>5</u>
2 to 5 miles	<u>4</u>	<u>7</u>
6 or more miles	<u>2</u>	<u>2</u>
e) <u>proximity to existing commercial and/or light industrial areas</u>		
immediately adjacent	<u>8</u>	<u>8</u>
within 1 mile	<u>6</u>	<u>6</u>
2 to 5 miles	<u>3</u>	<u>5</u>
6 or more miles	<u>2</u>	<u>2</u>
f) <u>proximity to harbour facilities</u>		
immediately adjacent	<u>6</u>	<u>7</u>
within 1 mile	<u>5</u>	<u>8</u>
2 to 5 miles	<u>5</u>	<u>5</u>
6 or more miles	<u>1</u>	<u>1</u>

	<u>Commerce</u>	<u>Light Industry</u>
g) <u>proximity to communications and power</u>		
served by existing major road	<u>8</u>	<u>8</u>
secondary road	<u>7</u>	<u>7</u>
power lines	<u>8</u>	<u>8</u>
water mains	<u>7</u>	<u>7</u>
telephone lines	<u>7</u>	<u>7</u>
h) <u>existing aesthetic value of area</u>		
high	<u>4</u>	<u>3</u>
average	<u>5</u>	<u>4</u>
low	<u>3</u>	<u>4</u>
i) <u>existing vegetation of area</u>		
mangrove	<u>3</u>	<u>3</u>
scrub	<u>6</u>	<u>7</u>
woodland	<u>4</u>	<u>5</u>
forest	<u>4</u>	<u>4</u>
agricultural land	<u>4</u>	<u>4</u>

3. Which types of commerce or light industry would you like to see developed, or further developed, in Tortola? Please list below in order of importance:
- 1.
 - 2.
 - 3.
 - 4.
 - 5.
4. If you have any comments about this questionnaire, or about commerce or light industry in general in Tortola, I would very much appreciate your making them below. Many thanks for your cooperation.

Christopher Howell

Note: The scores indicated represent the average ratings derived from survey returns.

APPENDIX VI
EXPERTS' QUESTIONNAIRE: HOTEL, RESORT
AND HIGH-COST HOUSING, AND DEVELOPED RECREATIONAL AREAS

1. Below are listed 12 factors, which in varying importance may affect the development and location of hotel, resort and high-cost housing, as well as developed recreational areas (such as parks, etc.). For each factor, please give a score (ranging anywhere from 1 to 9) to indicate the importance with relation to both hotel, resort and high-cost housing, as well as to developed recreational areas.

(A score of '1' would denote that the factor concerned is of minimal importance; '5' would denote that it is of average importance; and '9', that it is of maximum importance. Each score may be repeated as often as need be.)

	<u>Hotel</u>	<u>Resort & high-cost housing</u>	<u>Developed recreational areas</u>
a) number of individual land plots within proposed area	<u>6</u>	<u>6</u>	<u>7</u>
b) slope land land	<u>7</u>	<u>5</u>	<u>7</u>
c) water supply	<u>8</u>	<u>6</u>	<u>6</u>
d) existing land values	<u>6</u>	<u>7</u>	<u>8</u>
e) proximity to existing communications and power lines	<u>6</u>	<u>6</u>	<u>4</u>
f) proximity to existing urban areas	<u>3</u>	<u>5</u>	<u>4</u>
g) proximity to existing resort and high-cost housing	<u>4</u>	<u>5</u>	<u>5</u>
h) underlying geology	<u>5</u>	<u>4</u>	<u>4</u>
i) proximity to the sea	<u>8</u>	<u>6</u>	<u>5</u>
j) existing natural vegetation of the area	<u>4</u>	<u>6</u>	<u>6</u>
k) existing aesthetic value of area	<u>7</u>	<u>7</u>	<u>6</u>
l) proximity to areas of historic interest	<u>2</u>	<u>2</u>	<u>3</u>

2. Some of the factors listed on the previous page have been subdivided below into categories. Could you please use the 1 to 9 score range to signify which of the categories are best suited for hotel, resort and high-cost housing, as well as for developed recreational areas?

	<u>Hotel</u>	<u>Resort & high-cost housing</u>	<u>Developed recreational areas</u>
a) <u>size of area to be developed:</u>			
less than 1 acre	<u>2</u>	<u>4</u>	<u>3</u>
1 to 5 acres	<u>5</u>	<u>5</u>	<u>5</u>
6 to 9 acres	<u>7</u>	<u>4</u>	<u>7</u>
10 to 19 acres	<u>7</u>	<u>4</u>	<u>7</u>
20 to 49 acres	<u>5</u>	<u>4</u>	<u>7</u>
50 to 99 acres	<u>4</u>	<u>4</u>	<u>5</u>
100 or more acres	<u>3</u>	<u>4</u>	<u>5</u>
b) <u>degrees of slope:</u>			
0 to 12 degrees	<u>9</u>	<u>8</u>	<u>9</u>
13 to 22 degrees	<u>7</u>	<u>8</u>	<u>7</u>
23 to 30 degrees	<u>5</u>	<u>6</u>	<u>4</u>
31 to 45 degrees	<u>1</u>	<u>3</u>	<u>3</u>
more than 45 degrees	<u>1</u>	<u>1</u>	<u>1</u>
c) <u>existing land values:</u>			
low	<u>5</u>	<u>5</u>	<u>7</u>
medium	<u>6</u>	<u>6</u>	<u>6</u>
high	<u>7</u>	<u>7</u>	<u>2</u>
d) <u>proximity to existing commun- ications and power lines:</u>			
served by existing major roads	<u>6</u>	<u>6</u>	<u>7</u>
secondary roads	<u>6</u>	<u>7</u>	<u>6</u>
power lines	<u>6</u>	<u>7</u>	<u>5</u>
water mains	<u>6</u>	<u>3</u>	<u>4</u>
telephone lines	<u>6</u>	<u>6</u>	<u>3</u>
e) <u>proximity to existing urban areas:</u>			
immediately adjacent	<u>3</u>	<u>4</u>	<u>7</u>
within 1 mile	<u>6</u>	<u>6</u>	<u>6</u>
within 1 to 5 miles	<u>7</u>	<u>6</u>	<u>5</u>
within 6 or more miles	<u>1</u>	<u>2</u>	<u>2</u>

	<u>Hotel</u>	<u>Resort & high-cost housing</u>	<u>Developed recreational areas</u>
f) <u>proximity to existing hotel, resort and high-cost housing:</u>			
immediately adjacent	<u>2</u>	<u>4</u>	<u>5</u>
within 1 mile	<u>4</u>	<u>4</u>	<u>5</u>
within 2 to 5 miles	<u>6</u>	<u>5</u>	<u>6</u>
within 6 or more miles	<u>2</u>	<u>2</u>	<u>2</u>
g) <u>proximity to the sea:</u>			
immediately adjacent	<u>9</u>	<u>8</u>	<u>6</u>
within 1 mile	<u>6</u>	<u>8</u>	<u>5</u>
within 2 to 5 miles	<u>4</u>	<u>5</u>	<u>5</u>
within 6 or more miles	<u>2</u>	<u>2</u>	<u>2</u>
h) <u>existing aesthetic value of area:</u>			
high	<u>8</u>	<u>8</u>	<u>6</u>
medium	<u>6</u>	<u>6</u>	<u>5</u>
low	<u>2</u>	<u>2</u>	<u>3</u>
i) <u>existing vegetation of area:</u>			
mangrove	<u>3</u>	<u>3</u>	<u>3</u>
scrub	<u>4</u>	<u>5</u>	<u>5</u>
woodland	<u>6</u>	<u>7</u>	<u>7</u>
forest	<u>4</u>	<u>6</u>	<u>5</u>
agricultural land	<u>3</u>	<u>4</u>	<u>3</u>

3. Again, please give a score (from 1 to 9) to show how suited you believe each type of development listed below is for each of the types of areas listed.

	Valley bottoms	Residential areas	Coastal rocky areas	Flat coastal areas	Interior upland	Inland slopes
Large hotels	<u>2</u>	<u>3</u>	<u>4</u>	<u>8</u>	<u>2</u>	<u>2</u>
Medium hotels	<u>3</u>	<u>3</u>	<u>4</u>	<u>8</u>	<u>3</u>	<u>4</u>
Small hotels	<u>3</u>	<u>5</u>	<u>6</u>	<u>8</u>	<u>5</u>	<u>5</u>
Apartments and condominiums	<u>3</u>	<u>6</u>	<u>6</u>	<u>7</u>	<u>5</u>	<u>5</u>
High-cost homes	<u>2</u>	<u>4</u>	<u>7</u>	<u>7</u>	<u>7</u>	<u>6</u>
Marinas	<u>1</u>	<u>4</u>	<u>2</u>	<u>9</u>	<u>1</u>	<u>1</u>
Developed recreational areas	<u>5</u>	<u>6</u>	<u>4</u>	<u>7</u>	<u>6</u>	<u>5</u>

4. For their development in Tortola, which of the following do you think are the most suited? (Please use the 1-9 score range.)

large hotels	<u>2.0</u>	apartments and condominiums	<u>7.2</u>
medium-sized hotels	<u>7.7</u>	high-cost residential homes	<u>7.4</u>
small hotels	<u>7.7</u>	marinas	<u>8.4</u>
developed recreational areas	<u>7.0</u>		

5. If you have any comments to make about this questionnaire, or about the development of resort and high-cost housing, and/or developed recreational areas in Tortola in general, I would appreciate your making them below. Many thanks for your cooperation.

Christopher Howell

Note: The scores indicated represent the average ratings derived from survey returns.

APPENDIX VII
PUBLIC SURVEY QUESTIONNAIRE COMMENTS

1. What type of tourist accommodation would you prefer to see in Tortola?
 - A. Large hotel: 100 or more beds, swimming pool, outdoor bar, golf course, beach location, night shows, American-style food and living accommodations.
 - B. Medium-sized hotel: about 20 to 50 beds, swimming pool, near beach, serving mostly American-style food.
 - C. Small hotel or guest-house: about 5 to 15 beds, comfortable but simple accommodations, locally owned, and serving local foods as a speciality of the house.
 - D. Visitor-owned apartments (condominiums).
- (i) Tortolians
 - A.: "Tortola must cater to the wishes of the majority of its tourists"

"Tortola is in the unenviable position of needing development, but if this occurs, it will lose its raison d'etre as a tourist haven."

"Guest units -- 70% C + B, 30% D + A, confined to carefully researched and controlled locations."
- (ii) High School Students
 - No comments.
- (iii) Continental Immigrants
 - A.: "Not at all!"

"Not like St. Thomas"

"Not like Puerto Rico and V.I. (U.S. Virgin Islands) but somewhere to relax."

"Definitely not!"
 - B.: "With both local and continental food"
 - D.: "No -- not like Spain."

(iv) Visitors

A.: "Not A!". . . "Not A at all". . . "No" (18 responses)

C.: "Small hotels -- to be locally owned". . . "Locally owned" (4 responses).

"Locally owned or not, must offer fresh water, swimming pool, its own restaurant, some entertainment and recreation."

D.: "Should be rentable to insure local people have continued income, or taxed if not rented."

"We came here to get away from condominiums!"

"No high rises."

"Small guest-house -- too small to be efficient."

" 'A' and 'D' should be prohibited."

"C and B -- no other choice."

"Combination of what the H₂O can support."

2. Ideally, in the future, would you like to see (check one):

far more tourists than now? _____

more tourists than now? _____

about the same as now? _____

fewer tourists than now? _____

far fewer tourists than now? _____

(i) Tortolians

No comments.

(ii) High School Students

No comments.

(iii) Continental Immigrants

"No St. Thomas,"

"More tourists, but not living here, just sailing from it."

"Tortola can't handle mass tourism -- must rely on exclusive appeal."

(iv) Visitors No comments.

3. Below is a sketch-map of Tortola. If you can, please mark on the map:

- a) those areas which you find especially beautiful
(circle with a solid line)
- b) those areas, if any, which you find ugly
(circle with a dashed line)
- c) those areas which you would like to see developed, or further developed, for tourism in the future (please shade).

(i) Tortolians

- a) "All over beautiful" (6 responses).

"No parts ugly".

"It is just beautiful, but we the people should get together and unite more so it could be more beautiful and in order."

- b) "Hospital needs to be bigger and look more becoming."

- c) "Cane Garden Bay -- no hotels beyond local level ownership."

"Shark Bay -- coastal cliff as a wildlife preserve."

"Josias Bay to Little Lambert Bay -- whole region could become an important development region with hotel, restaurant and public beaches."

"Long Bay and Trellis Bay, Beef Island -- develop but retain for public use."

"Paraquita Bay, land adjacent to Beef Island Channel, and Little Cay - Hans Bay to Bluff Bay -- present typical ecologically uncontaminated areas and should be retained as such, especially with an eye towards fish hatcheries and future marine farming as technology progresses."

"Trunk and Rogues Bay -- develop for public use (park, beach, etc.)."

"Sea Cow Bay -- mangrove areas should be protected, village to grow naturally, waterfront cleaned up with proper public landing bulkhead and associated facilities."

"We think development is going too fast -- without enough thought being given to what our island looks like."

"Nice hotel needed in Road Town area (medium size) near a beach. If not -- construct beach. It is very difficult for one to have to pay a taxi \$16 and \$10 to take them to the beach every time they would like to go."

"Tourism in the BVI, if it is going to develop into a major industry, must take into account sparsely populated, more beautiful beach scenery as picturesque spots such as are also found on VG [Virgin Gorda], JVD [Jost Van Duke] etc.."

"Winding hillside roads common in Tortola cause heavy erosion."

(ii) High School Students

a) No comments

b) No comments

c) "Would like to see all of Tortola properly developed."

"All of it needs development."

"The whole thing needs to be developed."

(iii) Continental Immigrants

a) "The entire coastline, the ridge road -- Sage Mountain National Park are all especially beautiful."

"I find it impossible to answer as every part of the island has a beauty of its own."

b) "Maya Cove -- not ugly, but neither is it particularly beautiful -- too much individuality in choice of housing results in a messy looking hillside."

"Slaney -- too many match box like buildings that do not blend in with the coastline."

c) "No St. Thomas or more tourists."

"More emphasis on local custom, food, style -- exclusive hotels but local employees."

"Keep building in Road Town -- maintain style."

"Preserve quiet and beauty. No more 'Prospect Reefs' or 'Wickhams Cays'."

"I would like to see further development on the N. shore. Josias Bay suitable for small hotels etc., or Long Bay (Beef Island) but not both. The S. side of Beef Is. -- E. End is a good area to make an underwater national park."

"More culture and 'arts' development."

"Very controlled development -- high quality."

(iv) Visitors

- a) "The mountains are beautiful. . . .Marvelous landscape. . . .Great profile" (7 responses).

"Beautiful beaches. . . .Lovely beaches" (5 responses).

"All areas are beautiful, but be careful of trash! Supply more places for boats to dispose of trash."

"I'm not familiar enough with this area yet to indicate any preference."

- b) "Garbage dump ugly. . . .Garbage dump. . . .Dump" (14 responses).

"We found the beach areas lovely but immediately beyond the sand we found dumped garbage and messy upkeep -- there is so much beauty that it is a shame to have it all messed up with trash."

- c) "No more development -- you can go to St. Thomas for that!"

"Keep Tortola natural and beautiful."

"No high rises."

"Stay away from corporate developers and stick with the smaller operations. This also appeals to the tourists. Also, do not give away your best beauty to developers! Look to the other Caribbean islands and learn."

"Before expanding via large hotels, etc., you should consider whether the drain on resources (water, electricity, roads) will outweigh any dollar gains you receive. I've never met such uniformly friendly and dignified people anywhere in Europe. This really contrasts with all I've heard of the U.S. Virgins. Please learn from their mistakes."

"Remember St. Juan and St. Thomas -- preserve the people."

"The preservation of natural beauty and clean waters is primary along with a stable employed population. The run-off of raw sewage into the bay should be stopped quickly."

"Road Town should be developed with taste, and keeping existing architecture."

"40' height limit on hotels and business catering to tourism."

"Density limits -- St. Thomas is already a mess."

"'Beautiful areas' owe their beauty to minimal development."

"Cane Garden Bay and Brewers Bay -- but any but minor development might be detrimental."

4. What would you say is most important in attracting tourists to Tortola? Please list in order of importance:

natural beauty_____ cultural and social interests _____

climate_____ sports (sailing, fishing, etc.) _____

friendly atmosphere_____ other (please list) _____

- (i) Belongers

No comments.

- (ii) High School Students

"West Indian music."

"West Indian dishes. . .food" (4 responses).

"Friendly inhabitants."

- (iii) Continental Immigrants

"Unique architecture."

"Good service."

"No racial strife."

"No faceless bureaucracy."

"Peace and quiet."

"Shopping."

"Not overcrowded."

"Not like Puerto Rico and Virgin Islands but somewhere to relax."

"Not an Americanized suburb like St. Thomas."

"Safe sailing."

"Englishness of Tortola is what appeals to Americans."

(iv) Visitors

"Quaint, peaceful atmosphere."

"No credit cards."

"No big hotels."

"No cruise ship atmosphere."

"Cheaper facilities."

"Lack of booming tourist trade."

"Quiet atmosphere."

"Friendly -- people make the difference."

"Lack of crowding and commercialism; many places have 3 & 4 lovely small hotels like Long Bay."

"Remoteness."

"Few tourists and remoteness."

"Good food."

"Reasonable cost."

6. The last question, which is not anything as complicated as it looks. . . .' (Matrix questions.)

(i) Belongers

No comments.

(ii) High School Students

No comments.

(iii) Continental Immigrants

"Developed recreational areas -- designed to increase visitor awareness? e.g. walking trails?"

"Recreational areas -- controlled yes, but not developed."

(iv) "Developed recreational areas -- these should be developed but only along natural national park type design."

APPENDIX VIII
GAMMA-VALUES FOR EACH CULTURE GROUP

<u>System</u>	<u>Culture Group</u>			
	<u>Tortolian</u>	<u>High School</u>	<u>Continental Immigrant</u>	<u>Tourist</u>
<u>Coastal Lowland</u>				
Natural vegetation	5	6	6	7
Agriculture	5	6	6	6
Commerce	5	5	3	4
Resort housing	7	7	6	5
Hotels	7	7	6	5
Developed recreation	6	7	6	6
Industry	6	6	4	3
<u>Coastal Rocky</u>				
Natural vegetation	5	3	7	7
Agriculture	2	2	2	2
Commerce	2	3	2	3
Resort housing	3	4	5	5
Hotels	3	4	5	5
Developed recreation	2	3	4	4
Industry	3	4	2	2
<u>Inland Slopes</u>				
Natural vegetation	7	6	7	7
Agriculture	8	7	7	7
Commerce	2	4	3	3
Resort housing	4	5	4	4
Hotels	4	5	4	4
Developed recreation	3	5	3	4
Industry	4	5	3	4
<u>Interior Upland</u>				
Natural vegetation	7	6	7	7
Agriculture	7	6	8	6
Commerce	2	3	2	3
Resort housing	3	5	4	3
Hotels	3	5	4	3
Developed recreation	3	4	4	4
Industry	3	3	2	3

<u>System</u>	<u>Culture Group</u>			
	<u>Tortolian</u>	<u>High School</u>	<u>Continental Immigrant</u>	<u>Tourist</u>
<u>Major Urban Areas</u>				
Natural vegetation	4	5	6	6
Agriculture	2	4	3	2
Commerce	8	6	8	7
Resort housing	5	6	5	5
Hotels	5	6	5	5
Developed recreation	8	7	7	5
Industry	5	6	5	6

Note: The scores indicated represent the average ratings derived from survey returns.

APPENDIX IX
ALPHA-VALUES FOR EACH PARAMETER, BY SUBSYSTEM

Parameter	Subsystem						
	Natural vegetation	Agri- culture	Hotels	Resort housing	Developed recreation	Commerce	Industry
Size of land property	0	4	6	6	7	6	5
Soils	5	6	0	0	0	0	0
Water supply	0	9	8	6	6	6	8
Slope	7	6	7	5	7	8	8
Proximity to urban areas	6	3	3	5	7	6	7
Existing vegetation	5	5	4	6	6	4	4
Roads and pathways	0	5	6	6	4	8	8
Proximity to the sea	0	0	8	6	5	6	7
Aesthetics	0	0	7	7	6	4	4
Proximity to power lines	0	0	6	6	4	8	8
Development for tourism	0	0	9	9	9	0	0

APPENDIX X
BETA-VALUES FOR EACH DATA TYPE, BY SUBSYSTEM

<u>Date type</u>	<u>Subsystem</u>					
	<u>Natural vegetation</u>	<u>Agri- culture</u>	<u>Hotels</u>	<u>Resort housing</u>	<u>Developed recreation</u>	<u>Commerce</u> <u>Industry</u>
<u>Size of land property</u>						
less than 1 acre	5	8	2	4	3	7 4
1 - 5 acres	5	8	5	5	5	7 6
6 - 9 acres	5	7	7	4	7	6 7
10 - 19 acres	5	7	7	4	7	4 7
20 - 49 acres	5	5	5	4	7	3 6
50 - 99 acres	5	5	5	4	7	3 6
100+ acres	5	4	3	4	5	2 3
<u>Soils</u>						
alluvial	4	8	5	5	5	5 5
volcanic	5	7	5	5	5	5 5
limestone	5	6	5	5	5	5 5
diorite	6	4	5	5	5	5 5
<u>Proximity to urban areas</u>						
less tha 1/4 mile	4	4	3	4	7	6 3
1/4 to 1 mile	4	4	6	6	6	6 5
1 or more miles	6	6	7	6	5	4 7

Parameter	Subsystem					Commerce	Industry
	Natural vegetation	Agri- culture	Hotels	Resort housing	Developed recreation		
Water supply							
less than 35"	5	3	3	3	5	3	1
35" - 39"	5	4	4	4	5	4	1
40" - 44"	5	5	4	5	5	5	1
45" - 49"	5	6	5	5	5	5	1
50" - 54"	5	8	7	6	5	5	1
55" - 60"	5	8	7	6	5	5	1
over 60"	5	8	7	6	5	5	1
water mains	5	8	8	6	5	6	9
Slope							
0 - 12 degrees	3	9	9	8	9	9	9
13 - 22 degrees	3	8	7	8	7	5	4
23 to 30 degrees	6	6	5	6	4	2	3
31 to 45 degrees	8	5	1	3	3	2	2
more than 45 degrees	9	3	1	1	1	1	1
Communications							
served by major roads	5	5	6	6	7	8	8
secondary roads	5	7	6	7	6	7	7
footpath	5	6	5	5	5	5	5

Parameter	Subsystem						
	Natural vegetation	Agri- culture	Hotels	Resort housing	Developed recreation	Commerce	Industry
<u>Existing vegetation</u>							
mangrove	8	3	3	3	3	3	3
scrub	5	6	4	5	5	6	7
woodland	8	5	6	7	7	4	5
forest	9	4	4	6	5	4	4
agriculture	5	9	3	4	3	4	4
bare rock	9	1	1	1	1	1	1
beaches	9	1	1	1	1	1	1
<u>Proximity to the sea</u>							
less than 1/4 mile	5	5	9	8	6	6	7
1/4 to 1 mile	5	5	6	8	5	5	8
more than 1 mile	5	5	4	5	5	5	5
<u>Proximity to power lines</u>							
less than 1/4 mile	5	5	6	7	5	8	8
1/4 to 1 mile	5	5	5	6	5	7	7
more than 1 mile	5	5	5	4	4	4	4

Parameter	Subsystem					Industry
	Natural vegetation	Agri- culture	Hotels	Resort housing	Developed recreation	
<u>Aesthetics</u>						
high	5	5	8	8	6	3
medium	5	5	6	6	5	4
low	5	5	2	2	3	4
<u>Development ratings (tourism)</u>						
'9'	5	5	9	9	9	1
'8'	5	5	8	8	8	1
'7'	5	5	7	7	7	1
'6'	5	5	6	6	6	1
'5'	5	5	5	5	5	1

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BIOGRAPHICAL SKETCH

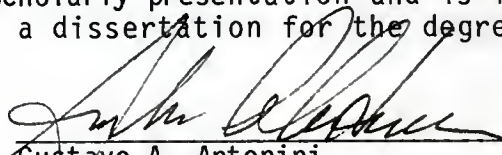
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I certify that I have read this study and that in my opinion it conforms to acceptable standards of scholarly presentation and is fully adequate, in scope and quality, as a dissertation for the degree of Doctor of Philosophy.



David L. Niddrie, Chairman
Professor of Geography

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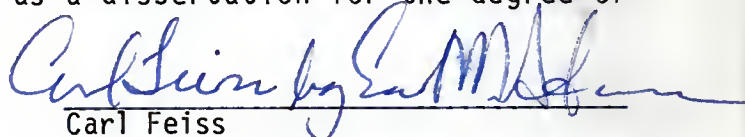
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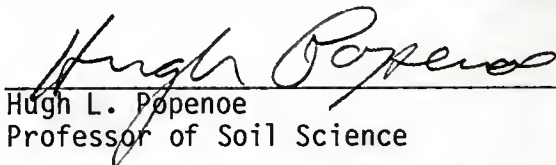
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This dissertation was submitted to the Graduate Faculty of the Department of Geography in the College of Arts and Sciences and to the Graduate Council, and was accepted as partial fulfillment of the requirements for the degree of Doctor of Philosophy.

June, 1978

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